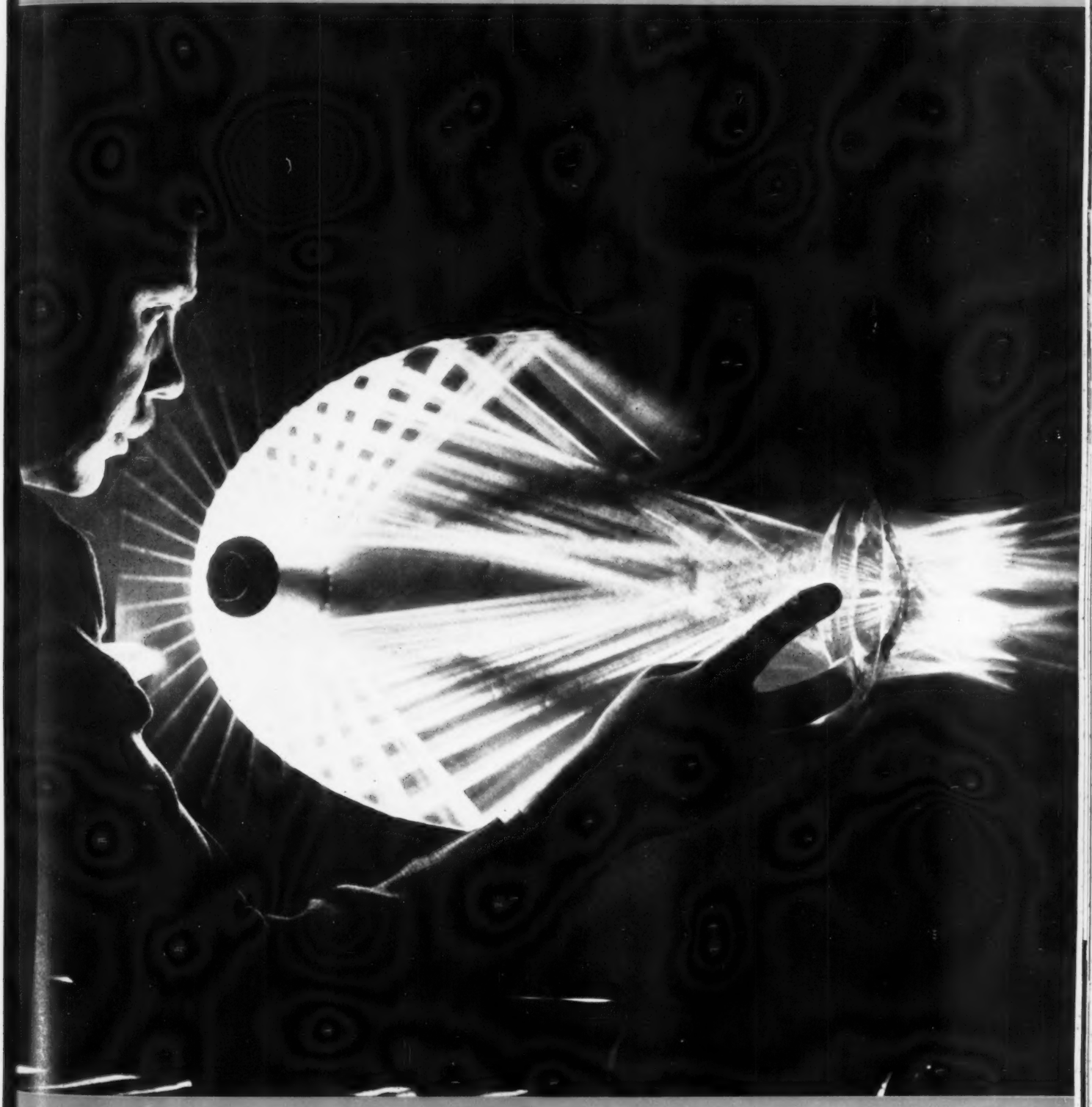
ELECTRICAL WEST

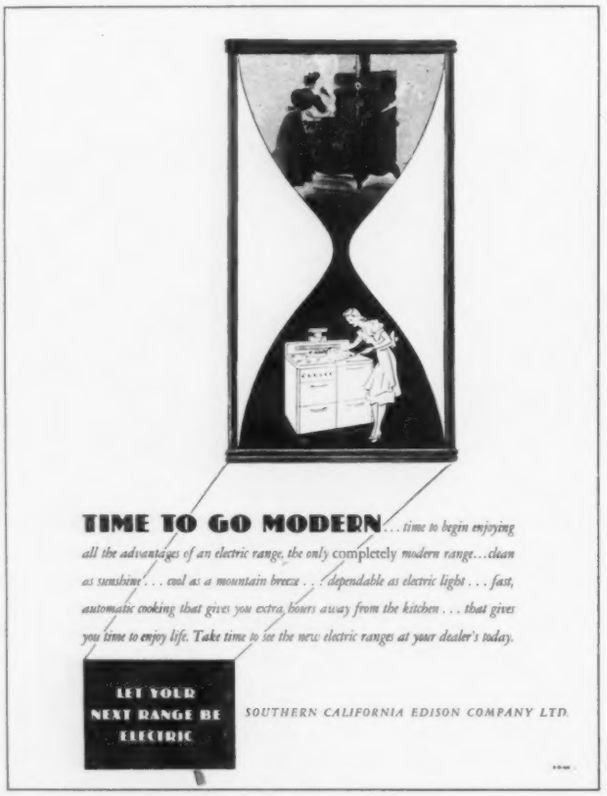
THE ALL-INDUSTRY MAGAZINE OF PROGRESS



GRAW-HILL CO.
CALIFORNIA

SEPTEMBER, 1940

25c a Copy


TIME TO GO MODERN . . . time to begin enjoying all the advantages of an electric range, the only completely modern range . . . clean as sunshine . . . cool as a mountain breeze . . . dependable as electric light . . . fast, automatic cooking that gives you extra hours away from the kitchen . . . that gives you time to enjoy life. Take time to see the new electric ranges at your dealer's today.
LET YOUR NEXT RANGE BE ELECTRIC
SOUTHERN CALIFORNIA EDISON COMPANY LTD.

TAKE A GOOD LOOK at an electric when you need a new range . . . you'll see the only completely modern range . . . fast, clean, cool, time-saving, automatic . . . all you're looking for at the price you want to pay. See your electric range dealer today.
Let your next range be ELECTRIC
SOUTHERN CALIFORNIA EDISON COMPANY LTD.

EVERY WOMAN WANTS ONE
. . . every woman wants a modern kitchen . . . a cool, clean kitchen equipped with a completely modern range . . . time-saving, automatically controlled, fast, dependable . . . all the features that only an electric range can give you.
See the new electric ranges at your dealer.
Let your next range be ELECTRIC
SOUTHERN CALIFORNIA EDISON COMPANY LTD.

Time to sell what every woman wants

More and more electric ranges are being sold every month because every woman wants a cool, clean kitchen equipped with the only completely modern range . . . an electric range. Big newspaper advertisements, run in every town in Edison territory where there is an appliance dealer, tell range prospects "LET YOUR NEXT RANGE BE ELECTRIC."

SOUTHERN CALIFORNIA Edison

9-40

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), September, 1940. Vol. 85, No. 3. Published monthly by the McGraw-Hill Company of California, 68 Post Street, San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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Why the Trend to PYRANOL REGULATORS FOR FEEDER-VOLTAGE CONTROL ?

From the old—to the new. A Pyranol induction regulator (right) has replaced an older G-E oil-filled unit. Part of a modernization program of a large midwestern utility—part of the trend to Pyranol.

EXTRA SAFETY

Plus Savings in Installation Costs

OPERATORS have been quick to recognize the many advantages of the new Pyranol induction regulator. For the first time, they can obtain the safety and economy of Pyranol* in a regulator. Because it is of the *induction* type, this regulator also has the advantage of inherent simplicity of design.

Pyranol can't burn, so these regulators can be installed indoors without the costly cell construction normally used to isolate oil-filled equipment. Both installation costs and space requirements are minimized.

Get complete information on Pyranol regulators from our local representative, or write for Bulletin GEA-3443. General Electric, Schenectady, N. Y.

*Pyranol is General Electric's noninflammable, nonsludging insulating and cooling liquid for electric equipment.

GENERAL ELECTRIC

404-11

Here in the WEST

People

Lawrence Robertson

has been in charge of the transmission and station engineering department of the Public Service Co. of Colorado since 1925.

Born in Denver, he went to school there, receiving his initial utility training when

he was 12 years old as an office boy for Public Service.

He graduated from the Univ. of Colorado with a B.S. degree in 1922, and went immediately to work for Public Service, acquiring general experience in the meter shop, in distribution, line construction, general accounting, steam plant, results engineering, maintenance, transmission and substation engineering departments.

F. M. Falge

was transferred to the South Pacific Division of the General Electric Lamp Dept. in Los Angeles in 1939, his principal assignment there being with the motion picture studios.

After graduating from the United States Naval Academy in 1924, he became affiliated several years later with the engineering department of the G-E Lamp Dept. at Nela Park, and was assigned to theatre lighting.

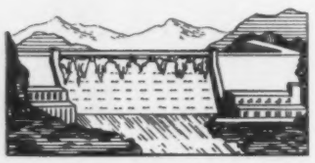
He left G-E in 1928 to work for the Paramount Corp. in New York, and was responsible for lighting their spectacular stage shows.

Falge is a member of IES, Society of Motion Picture Engineers, and a member of several technical committees of the Assn. of Motion Picture Arts & Sciences.

Preview

Keeping Coulee Warm

When Grand Coulee dam starts exercising its full influence over the flow of Columbia River, it will have a year-round job. At some time the great drum gates

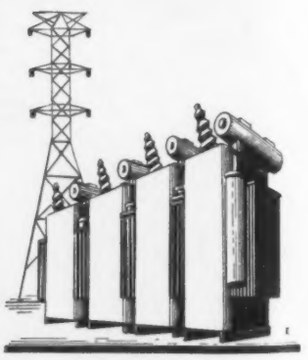


may be called upon in the dead of winter, to respond instantly, to release water to maintain the river flow.

To guarantee this response, Bureau of Reclamation engineers had to provide a means for keeping these gates from freezing. Exhaustive tests led to the installation of an induction heating system. This supersized job will be described in detail next month by a Bureau engineer.

Substitute

Adequate Wiring made great strides during the past twelve months since the first of the wiring conferences was held in the West at San Francisco. In place of a conference this year, ELECTRICAL WEST, in October, will review progress in that job, tell of methods that proved successful so that all sections of the West may again exchange ideas by this means.



Heavy Equipment

System extensions have led recently to the building of several large substations throughout the West. As might be expected, the design of these units reflects improvements in apparatus and technique. Articles in the engineering section of the next issue will be of special interest to substation engineers.

Pages

Black Light 31
By F. M. FALGE—Lighting effects in southern California theatres is thoroughly outlined.

Lifesaving with Light 34
Pictorial presentation of typical western highway lighting installations.

Sports—After Sunset 36
All forms of recreation are now possible by floods of "natural daylight."

Substation Built for Flexibility 41
By LAWRENCE ROBERTSON—The story of the new Dry Creek substation erected by Public Service of Colorado.

Relays Save $$$ 43
By R. RADER—Why bus-sectionizing protection is an economical step.

Refrigerator Hospital 58
A Los Angeles business man's success story that means much to electrical dealers in that area.

New Products 4
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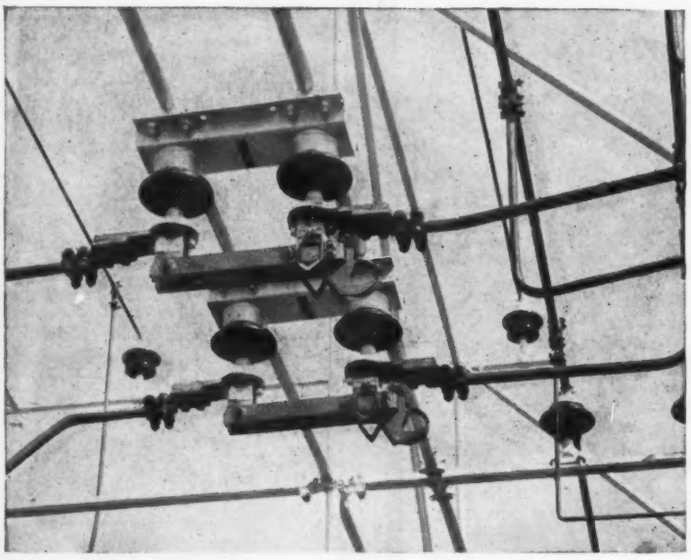
Cover: Symbolic of lighting itself is the fundamental reflector and lens, the two means by which light is controlled to man's many uses, as pictured in this General Electric research laboratory photograph.

Ersatz ?

THESE DISCONNECTS *are built for* LONG-LASTING, RELIABLE SERVICE



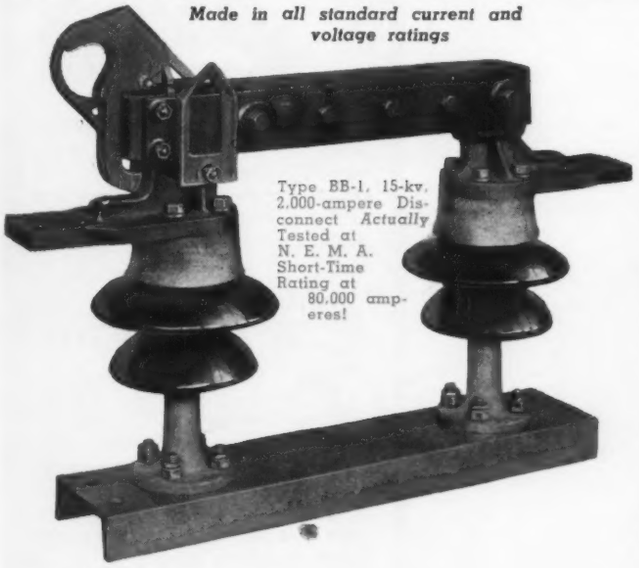
From all over America comes praise for these long-lasting and reliable disconnects—built with no cheap substitutes!

They are easy to install—then you forget about them for maintenance is about nil. Their cool and easy operation over the years warms the hearts of "show me" engineers. That's because they are built *rugged*—they easily withstand the elements and rough pulls or thrusts from the operating stick!

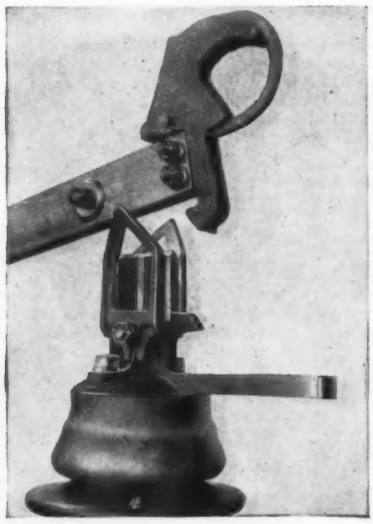
You can have formed-steel bases that are stiffer and stronger, with hold-down bolts located along flanges for easier, faster, lower-cost mounting . . . you get the best insulators, high conductivity, pry-off safety latches, clamp-type terminals, heavy galvanizing, A.I.E.E. and N.E.M.A. Standards.

So why waste money on poor-quality switches that are of weak structure with blades that may bend, become hard to operate or with contacts that may overheat and stick?

Made in all standard current and voltage ratings



Type BB-1, 15-kv, 2,000-ampere Disconnect *Actually* Tested at N. E. M. A. Short-Time Rating at 80,000 amperes!



High-Pressure Ribbed-Contact Surface

Pacific Electric, specializing in switching equipment, saves you money, cuts maintenance and assures long-lasting reliable service through sound design. Get all the facts as other smart utility men are doing. Ask for free Bulletin No. 68.

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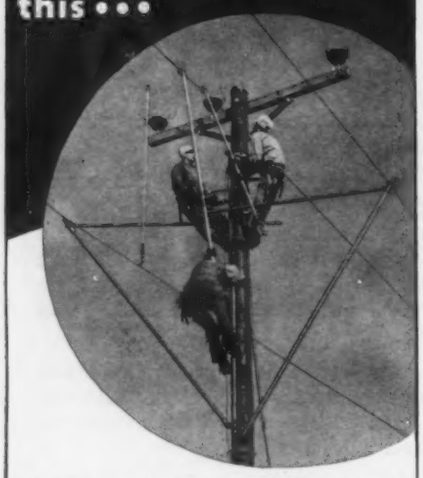
5815 Third St., San Francisco — *Representatives in Principal Cities* — Dunes Highway, Gary, Indiana

PAGES LIKE THIS show the simplicity safety and economy of doing jobs like this • • •



With TIPS TOOLS

You will see that hot line maintenance is reduced to its simplest, safest form when line crews are outfitted with Tips Tools. You will convince yourself that in many cases, this is the cheapest and quickest means of making line repairs and that in practically all cases, hot line work with Tips Tools is a big money saving proposition.

This new catalog will help you in the selection of the right tools for every job. It illustrates the simplicity and safety of Tips Tool designs. Send for your copy.

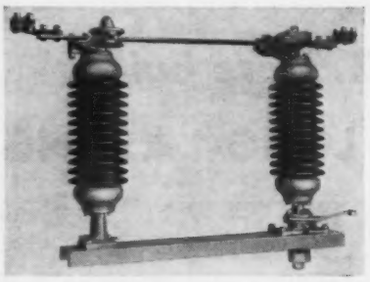
ABC INDUSTRIES

A·B·CHANCE CO. CENTRALIA MISSOURI

NEW PRODUCTS

Air-break Switch (901)

An air-break switch has been developed by Pacific Electric Mfg. Co. that employs high-pressure rolling contact which rotates with each operation of switch blade. This design is said to offer easier operation and longer con-



tact life. Type YSW is made in standard sizes and ratings with single horizontal side break, single throw, rotating insulator with widely-spaced bearings.

Fuse Tongs (902)

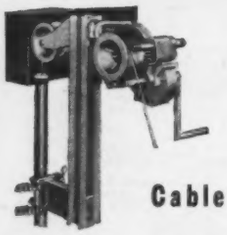
Sure-grip fuse tongs that provide easy and safe handling of power fuses, are now manufactured by General Electric. Features of these new tongs are that they grip fuses tightly—prevent breakage through dropping; have insulated handle for safe operation; insulated head to prevent accidental faults when fuses are being removed or replaced; are mechanically strong, yet light in weight. The tongs are readily adjustable for the easy handling of fuses mounted at any height from ground level to 15 ft.

Vibrating Bell (903)

A universal vibrating bell, made in three sizes, for use as burglar alarms, call signals and elevators, has been developed by Signal Electric Mfg. Co. A large bell, it is non-adjustable, with double coil construction, and

operates on either 1½ to 3-volt battery or with bell ringing transformer. The gong is nickel, with base and cover of drawn steel. Standard finish is black enamel.

Greenlee TOOLS Are EASIER And FASTER For The Man on the Job



Cable Puller

The Greenlee Cable Puller shown here eliminates the heavy, cumbersome equipment formerly used for pulling in cable. Now, this Greenlee, which anchors right on to the conduit through which pull is made, will make the toughest pulling job easy.

Conduit Benders

The Greenlee Hydraulic Conduit Bender is a portable, light tool, easily carried to the job and set up, that can be operated easily and quickly by one man, and one that will save you time and money on every job.

Knockout Tools

Greenlee Punches and Cutters will enlarge holes in metal boxes easily and quickly, leaving a clean, smooth hole that requires no reaming or filing. Another example of Greenlee tools that help you save time and money on every job.

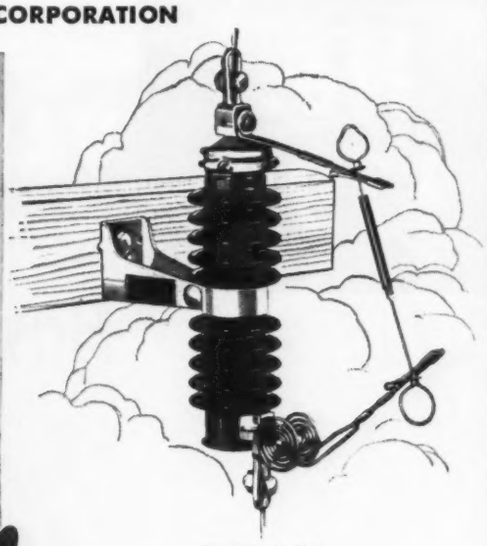
Write for Catalog 31E

GREENLEE TOOL CO.

1703 Columbia Ave.

ROCKFORD ILLINOIS

FROM THE ENGINEERING DEPT.—JAMES R. KEARNEY CORPORATION



The Trip-O-Link
5000 to 15,000 Volt, 50 Amp.
Fuse Switch

double Wedge type CONTACTS

OPERATING men or engineers who might be interested in analyzing why inexpensive Kearney Trip-O-Link Switches perform so efficiently, quietly and accurately in service will quickly see that design refinements of contacts of these switches are mighty important.

These contacts are formed with spring steel Copperweld. A multi-turn coil forms the lower contact to provide ample resiliency to place a mild tension on the link when in place, and to separate contacts speedily when the link blows.

Both top and bottom contacts have double "V" or crotch ends to receive the fuse link.

The tension on the link in service is approximately 3½ pounds, but the contact pressure on it is near 40 pounds. This pressure is accomplished when the fuse link body wire is drawn snugly into the contact. Thus, high pressure is secured with low link tension . . . a tight, clean, noiseless point-pressure contact of excellent, permanent conductivity.

The double "V" wedge-type contacts also permit fuse inspection without service interruption and — there is no danger of a blown fuse wire being pitched out of the tight gripping contact.

Yes, properly designed contacts are an important reason why Kearney Trip-O-Links give such excellent protection at surprisingly low cost. May we explain other features of this money-saving switch?

Exclusive Sales Representatives
MAYDWELL & HARTZELL, Inc.
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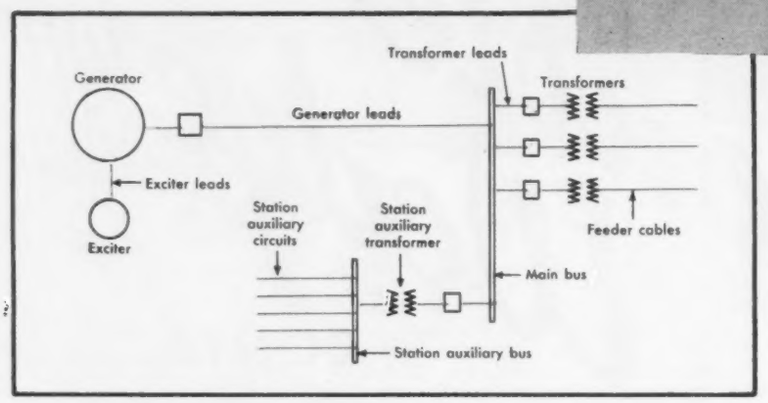
USE **KEARNEY PRODUCTS**
FOR BETTER MAINTENANCE and CONSTRUCTION

No. 1799 VARNISHED CAMBRIC

Has the LONG LIFE Needed for STATION CABLE



For runs from generator, to buses, switches, feeders, and station auxiliaries—at all voltages

THOSE properties of an insulated cable that make it last are inherent in varnished-cambric cable. This is borne out by performance records. G.E. originated this type of cable and first manufactured it about 1900; since then thousands of installations of VC station cable have been made, and their records are evidence of its long life.

Properties Are Inherent

The reasons: With cloth tapes wrapped around the conductor, the insulation cannot get out of place. The insulation is uniform throughout the length of the cable, whether that be 10 feet or 10 miles. The insulation is elastic, and the cable is flexible—easy to handle and to install. In soldering, the insulation is not easily injured. Jointing and terminating are simple operations.

No. 1799 Has Even More

In No. 1799 varnished cambric, all these properties are retained and another added: it is more heat-resisting. The cable can be operated at 85 C, maximum, approximately 10 deg higher than could the former G-E design. This means, of course, savings in copper, particularly advantageous for station wiring where heavy currents must be carried at low voltages.

Special Design, If Needed

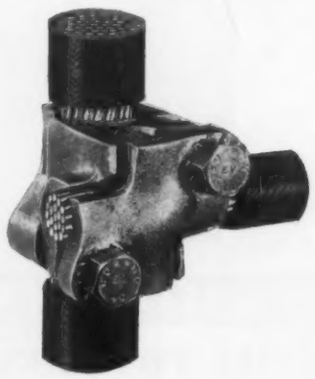
No. 1799 VC cable is available in all standard types: braided, leaded, and armored; also for transformer, apparatus, and switchboard leads. Often the requirements of a station cable call for a slightly off-standard type, and our engineers have designed hundreds of these. If in doubt as to which type is best for a particular station job, call a G-E cable specialist. General Electric, Schenectady, N. Y.

GENERAL ELECTRIC

500-10

Connector (904)

Burndy Engineering Co.'s newest electrical connector, VERSITAP, type QPX, is a connector that may be used as a parallel tap, a T-connector, a cross connector or as an end-to-end connector and will clamp a large range and combination of cable sizes in either the main or branch connection grooves. Compact,



the VERSITAP may be readily taped and is installed with an ordinary wrench. It is formed of high strength materials on those parts which carry the mechanical stress and high electrical conductivity material on the part which transmits the electrical current. Ten sizes accommodate cables from No. 8 to 1000MCM. Each clamp accommodates a range of sizes and overall dimensions on the line decrease when supplied for smaller diameter conductors.

Fight Timer (905)

The Tork Clock Co. presents a new Radio Fight Timer which shows all exact timing details of boxing bouts on the air. This specially decorated Fight Timer is self-starting, synchronous motor operated after plugging it in an a.c. circuit. A hand switch is tripped at the gong for the first round and thereafter until the end of the contest it

shows the split-second time of every round and rest period. It is made in two sizes. The 6-in. size, called the Television Model, is for private use on Television or radio receivers and the 14-in. square Wall Type is for semi-public use in club rooms, etc.

"Sealed-Flo" Units (906)

"Sealed-Flo" units now manufactured by the Benjamin Electric Mfg. Co. feature a new sealed cover construction which not only protects the Fluorescent lamps and reflecting surfaces from dust and dirt, thus reducing cleaning and maintenance costs, but also extends the use of fluorescent lighting to locations requiring vapor-proof and dust-tight fixtures, opal glass diffusing fixtures. These units are available in arrangements for two or three 48 in. fluorescent lamps. Light absorption of the special clear glass cover only slightly affects the rated 78% light output efficiency of unit.

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Lamp Replacers
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Send for Catalogue
We have been making safety tools for 24 years

THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

TORK CLOCKS

THE POPULAR TIME SWITCH LINE KNOWN EVERYWHERE

NOW—lower prices and higher capacities

There is a Tork Clock for every regular switching job; 60 minute, 4 hour or daily cycles.

Bulletins on request

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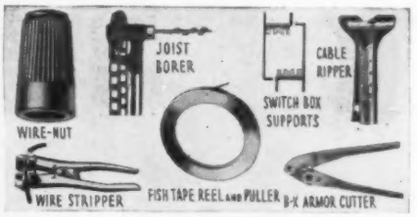
H. M. Sayers, 1019 Eastlake Ave., Seattle
Stevens Sales Co., 41 P. O. Place, Salt Lake City

NEW ***NOW only $1.50***
Fish Tape, Reel & Puller No. 00 "HANDY"

Complete fishing equipment at the usual price of a Reel only! Gives you safe, sure grip while fishing—no costly tape breakage—no dangerous live wire contacts from loose tape. Only 7" in diameter—easily fits in kit. Complete with 50 ft. of top quality ⅛" x .045" tape. Ask about 7 other sizes of reels to meet every requirement.

NEW **BX ARMOR CUTTER**

Strips BX armor in one simple operation! No more nicked insulation—shorts—or wasted BX. Jaws take BX cable of any make, 2 or 3 wire, No. 12, No. 14. Handy pocket size. Inexpensive. See one at your jobber's.



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IDEAL COMMUTATOR DRESSER COMPANY
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Banking by Mail for **BUSINESS FIRMS**

CONVENIENT
Overnight service to most points in California.

SAFE
Used in increasing numbers by out-of-town business houses.

ECONOMICAL
Saves money because it saves valuable time.

CROCKER FIRST NATIONAL BANK
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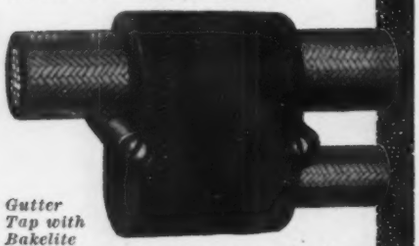
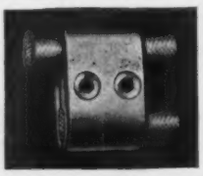
The MOST COMPLETE LINE OF
Cable Taps

Parallel and 90° taps—and combinations—for the widest variety of applications. For conductor sizes up to 1,000,000 CM.

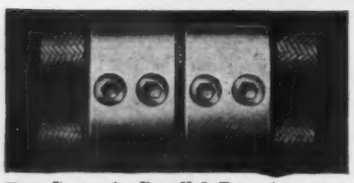
Now you can select from a really *complete* line of standard and special taps. Carefully designed—made right—and giving excellent service to all classes of users.



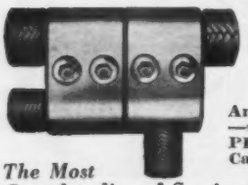
Gutter Tap with Bakelite Cover. Insulating covers can be furnished for all types of Penn-Union Cable Taps.



2-Way Gutter Tap; main and branch sizes 8 to 1,000,000.



Two Separate Parallel Taps to a continuous main conductor.



Combination Cable Tap; one branch tap parallel to main, and one at 90°.

And many more—write for the PENN - UNION Catalog.

The Most Complete line of Service Connectors—Terminals—and thousands of other fittings, for all requirements.

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1063 HOWARD STREET
SAN FRANCISCO

J. W. WATKINS
538 SKINNER BLDG.
SEATTLE

PENN-UNION ELECTRIC CORP., Erie, Pa.

PENN-UNION
Conductor Fittings

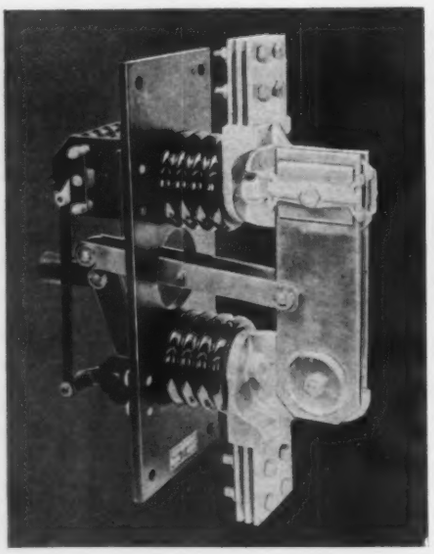
Kelvinator Range (907)

Introduction of the ER-9, a new low-priced model which has been added to the 1940 line of Kelvinator electric ranges and which carries a suggested price of $99.50, is made by Frank R. Pierce, Kelvinator's general sales manager. The new model is of one-piece welded steel construction, and its features include the new Kelvinator Chromalox surface

units; a full six-quart Scotch kettle; five-speed bi-rotary silver contact switches; and a combination oven and thermostat with automatic pre-heat cutout and "Broil" and "Bake" pilot lights.

Remote Controlled Switch (908)

Remote controlled, group operated switches offer many advantages, particularly where safety, convenience of operation, interlocking, signalling and lamp indication are desired. This 7.5 k-v., 2500 amp. switch, manufactured by Delta-Star Electric Co., is supplied with a completely enclosed four-stage Type "M" auxiliary switch for signalling and lamp indication, the auxiliary switch being linked to the operating mechanism of the main



switch. Although shown single pole, three such units can be arranged for group operation. The main switch is of the slotted tongue construction with full floating blades and adjustable line pressure contacts; hinge is of the annular ring, line pressure design.

JEFFRIES

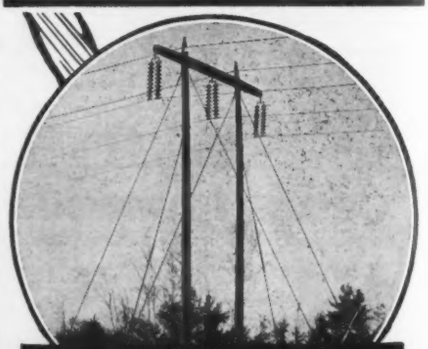
TRANSFORMERS

BUILT TO ORDER IN A HURRY!!

When you are installing or re-arranging—and need a special transformer to exactly match your requirements—call on us. We can deliver in a week to 10 days.

Specify scattered transformers to eliminate duplicate conduit runs and save on power costs.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles, Calif.



Crapo
GALVANIZED STEEL
STRAND

STRENGTH, ruggedness and durability are combined with definite economy in *Crapo* Galvanized Steel Strand. Low first cost, low maintenance expense are matters of record wherever this time-tested product is in use. Available in all standard grades and sizes from representative jobbers throughout the country. Or, write—

INDIANA STEEL & WIRE CO.
MUNCIE, : : INDIANA

If you're at all interested in

- **Better control of friction heat and combustion heat**
- **Slower rates of wear**
- **Increased power offtake**
- **Savings on shutdown losses**
- **Reduced outlay for lubricants**

then you should be very much interested in Shell's SAFETY FACTORS.

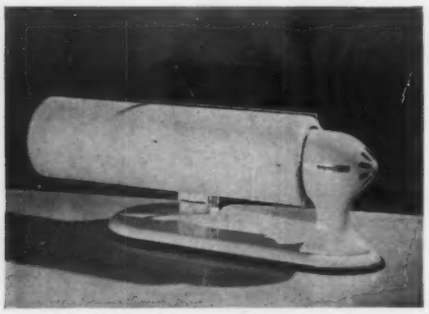
These extra values in Shell Lubricants and service are producing one or more of the above-listed benefits for thousands of our industrial customers.

SHELL

If you're wondering "what are these Safety Factors?... what specific savings can they offer me*?"... call up your local Shell office. We promise you that every minute you give the Shell representative can pay you back substantial dividends.*

Hotpoint Ironer (909)

Retailers of home laundry equipment and homemakers with limited laundry space, will welcome the new Hotpoint "Priscillaette," a light-weight portable electric ironer. Easy to handle and to store, this ironer can be used on a table. Fingertip control of show and roll provides safety and convenience to the operator, while the automatic heat control



gives flexibility in ironing various fabrics of different weights. The 22-in. roll will accommodate all kinds of clothes and household linens. Rated at 1,275 watts, the "Priscillaette" is designed to operate on 110 volts.

Fluorescent Luminaire (910)

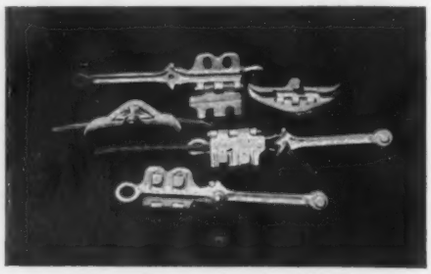
An open end twin-lamp fluorescent luminaire, utilizing 40-watt, 48-inch Mazda Type F white or daylight fluorescent lamps, and designed especially for general or supplementary lighting of low bay industrial areas, has just been introduced by Westinghouse. This unit, the type FPR, is available only in the spread distribution style for operation on 110-125, 199-216, and 220-250 volts, 60 cycle a.c. The luminaire consists of a hood, reflector, lamp holders, starting device, and ballast equipment. The hood is fabricated sheet steel and carries the hinged porcelain enameled steel reflector which provides high overall efficiency with a light cut-off of 72½° from the vertical. The lamp starter is completely self contained in an aluminum housing which plugs into a socket located in the fixture hood; thus it may be replaced for maintenance just as easily as the lamps themselves. A glow switch and condenser are standard equipment in the starter and minimize radio interference.

Rural Refrigerator (911)

Meeting the special refrigeration needs of the farm, brought about by expanding rural electrification, the Hotpoint Refrigeration Sales Division has just introduced the new "Rural 8 Special" Hotpoint refrigerator. This is an 8-cu. foot unit having three split shelves, making it possible to accommodate cream cans and other bulky objects requiring large cold storage space unobstructed by shelves —for example, packs of vegetables prepared for the locker can be stored here until all are filled. In all other respects, this refrigerator is exactly the same as the regular Hotpoint 8-cubic foot special model. The Speed Freezer contains five pop-ice trays, each making two pounds of ice at one time. With ice trays removed, the Speed Freezer compartment provides ample room for storing frozen foods from the locker until they are used.

Compton Line Clamps (912)

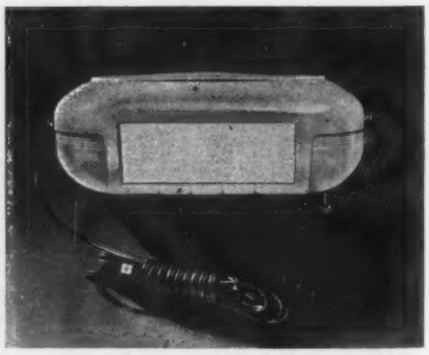
A series of line clamps, on which application for patent has been made, are being offered by Clair E. Compton, Los Angeles manufacturer. Illustrated are the 4/0 long strain and the 4/0 suspension, which will accommodate wire sizes from 2/0 to 250,000 cir. mil. Based on tests by a large operating company, the designer states, the clamps save 57 per cent of a lineman's time over instal-



lation of a similar conventional unit. Absence of loose parts is a safety feature. The units are hinged on one side, and the bolts (one for the suspension type, two for the strain) are on the other side, well apart to allow access with a wrench and permit easy manipulation with hot sticks.

Better Sight Bed Lamps (913)

The first bed-lamp specifically designed and engineered to give better light for better sight, and at the same time styled to blend with almost every bedroom decorative scheme, has been developed by the Mitchell Mfg. Co. Outstanding feature of the "Luxuray" is the fact that the light source is properly shielded, diffused and directed, thereby making available for the first time, conditioned light for reading in bed. The smooth curved lamp shell—a mere ten inches



in width—is constructed of perfected plastic and contains a diffusing window of DuPont Plastacele. This window, rectangular in shape, makes it possible to put more directed and controlled light on the page than ever before. The lamp bulb socket is attached to an aluminum plate which, in turn, is fastened to the lamp shell proper by a set of thumb screws. The bulb, socket and plate are removable as a unit when a bulb change is necessary. The clamps which hold the lamp to the headboard are rubber covered and flexible, while the "Luxuray" itself has a nine-foot cord, ample to reach any wall outlet.

STRONG, NEAT CONNECTIONS!

TELESCOPE BM SYSTEM

Nothing clumsy about the way B-M connectors and couplings do the job . . . no chance for sags or slips. Squeeze the patented B-M Indenter twice and you're SURE it's done RIGHT.

ALSO:
- Save 25% on materials.
- Save 25% to 50% on time.
- Quick, easy installations.
- Eliminate complications.
- No fussing with nuts to tighten.

Speed and Accuracy for More Profit!

$1.25 Buys the One Tool Needed

This one patented tool (½" Indenter) handles 80% of all installations. Pays for itself many times over on the very first job.

Approved by Underwriter's Laboratories

Distributed By:

The M. B. Austin Co., Chicago, Ill.
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National Enameling & Mfg. Co. Pittsburgh, Pa.
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Enameled Metals Co., Pittsburgh, Pa.
Triangle Conduit & Cable Co., Elmhurst, New York City

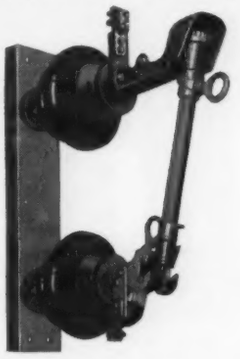
BRIEGEL METHOD TOOL CO., Galva, Illinois

FASTER CLEARING OF FAULTS PROVIDED BY S & C SEMAFOR DESIGN

• • •

CUTOUT PERFORMANCE IMPROVED

Look inside the fuse tube when selecting cutouts.—There you will find what makes the big difference in performance and upkeep cost.



S & C. Type MSO Semafor Open Cutout with NEMA Standard Insulators. Tube in closed position. Rating: 7500 Volts, 50 Amperes.

Look at the cut-away tube illustrations, which show clearly how the S & C Semafor principle provides for quick, positive separation of terminals and free discharge of vapor from the vent end of the tube. These and other features give you:

1. Faster and more positive clearing of all faults.

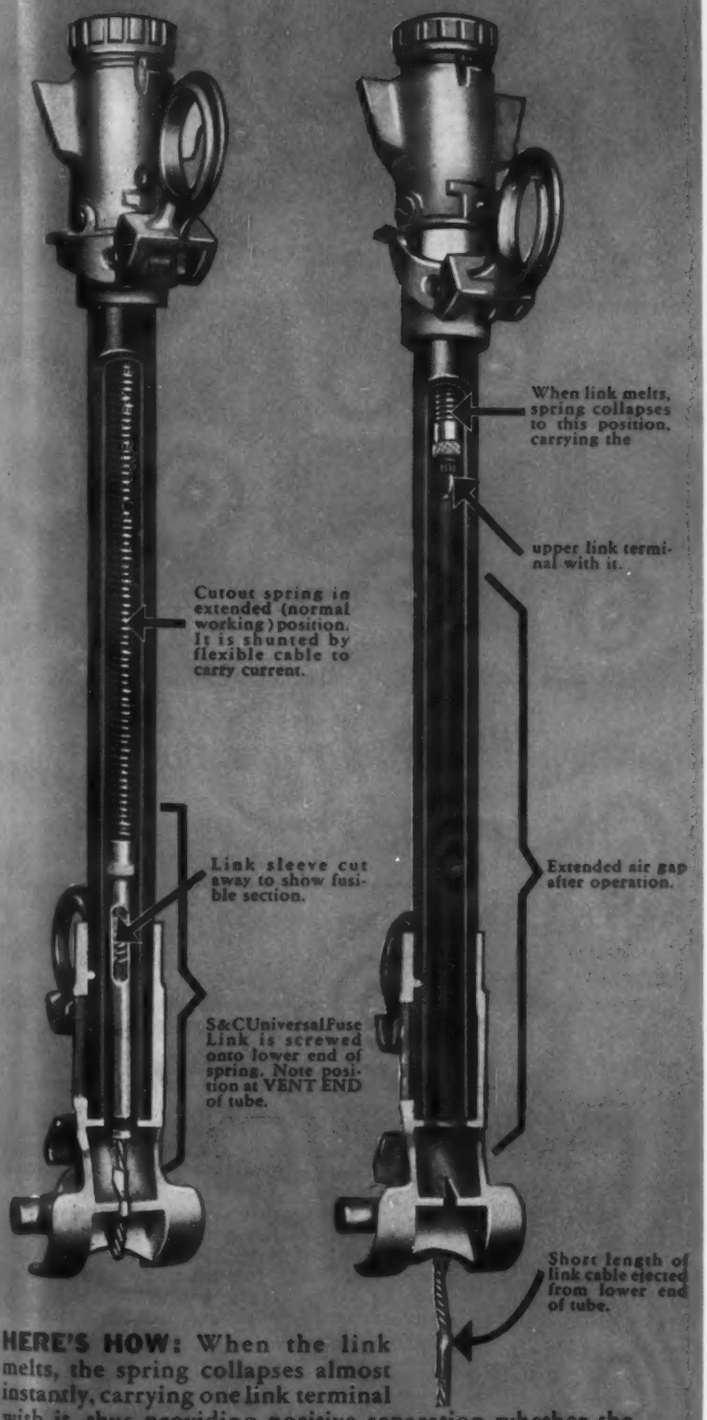
2. Reduced noise and discharge on heavy faults.

3. More dependable clearing of low-value fault currents.

4. Elimination of the danger from long, dangling cables after the operation.

Remember, it's the S & C tube design that makes the big difference —a difference engineers of experience quickly recognize on inspection.

S & C Type RSO-3Z Semafor 3-shot Recloser Cutout with sub-standard insulators. Rating: 7500/12,500 Volts, 50 Amperes. First Fuse Tube shown in open (dropout) position. S & C Cutouts are also made with NEMA insulators and in heavy duty types with interrupting capacities up to 7000 Amperes.


When link melts, spring collapses to this position, carrying the
upper link terminal with it.
Cutout spring in extended (normal working) position. It is shunted by flexible cable to carry current.
Link sleeve cut away to show fusible section.
Extended air gap after operation.
S&C Universal Fuse Link is screwed onto lower end of spring. Note position at VENT END of tube.
Short length of link cable ejected from lower end of tube.

HERE'S HOW: When the link melts, the spring collapses almost instantly, carrying one link terminal with it, thus providing positive separation whether the fault current is large or small. By this action the arc is lengthened, and the area of the tube lining exposed to the action of the arc is increased. This provides a continuously increasing flow of gases down along the path of the arc toward the open end of the tube as long as the arc persists.

The arc is established at the vent end of the tube, and the free discharge of the vaporized metals from the fusible element, and of the gases generated by the action of the arc on the lining of the tube, prevents the building up of excessive gas pressures which would tend to damage or destroy the tube.

Only a very short length of flexible cable remains at the lower end, and this is easily ejected from the tube by the gas discharge.

SCHWEITZER & CONRAD, Inc.
4435 Ravenswood Ave.
CHICAGO, ILLINOIS

Manufactured in Canada by Powerlite Devices, Ltd., Toronto, Ont.

CUTOUTS and RECLOSERS

PRINT IN BINDING

CAMPAIGNING ON A PLATFORM THAT EVERY HOMEMAKER WILL ENTHUSIASTICALLY ENDORSE
PERSONAL LIBERTY IN THE AMERICAN KITCHEN
LOWER TAXATION ON THE FAMILY BUDGET
ECONOMY IN THE HOUSEHOLD BUDGET!

HOTPOINT'S NEW

Climaxing a Series of Great Hotpoint Selling Programs the New Presidential Campaign Is Tied in with the Exciting Presidential Election

THE PROGRAM IS COMPLETE WITH

1 National Advertising
in leading magazines—*American Home, Better Homes and Gardens, Bride's, Electricity on the Farm, Good Housekeeping, House Beautiful, Ladies' Home Journal, McCall's,* featuring Hotpoint's New President Electric Range.

2 New Direct Mail
available for localized activity.

3 New Store Displays
with the touch of showmanship that interests and sells prospects.

4 New Election Banners
for display purposes.

5 Newspaper Campaign
based on Presidential theme.

6 Posters
—better than ever before.

7 Movie Promotion
"Blame It On Love." New plans for exploiting this powerful sales medium.

8 Special Sales Promotion Package Deal
A balanced selection of material for an active campaign.

Men Build Character

At Hotpoint we have an idea exchange in the form of get-togethers where each fellow learns something about the other man's job. In this way our folks get to know each other.

One of our customers once said to our Plant Manager: "What do you think is the best thing about Hotpoint products?"

The Plant Manager knew all our salespeople, engineers and factory men through our get-togethers. He thought a moment, then replied:

"It's character! Our men are good craftsmen with good character. Good craftsmen always build their character into the merchandise they produce. Thus, the best thing about Hotpoint products is the good character our men build into them."

The good character in Hotpoint products is one reason why they give satisfactory service to 17,000,000 families.

R. J. Cornbull
Vice-President

New Friendly Finance Plan makes buying and selling easier

Hotpoint ELECTRIC RANGES

ELECTRIC RANGES · REFRIGERATORS · WATER HEATERS · WASHERS
IRONERS · CLOTHES DRYERS · DISHWASHERS · ELECTRASINK

ADEQUATE DEFENSE AGAINST WORK, WORRY, EAT
SOCIAL SECURITY FOR MODERN HOMEMAKERS
PREPAREDNESS FOR UNEXPECTED GUESTS
PRIVATE INITIATIVE IN PREPARING DELICIOUS MEALS
NO ENTANGLEMENTS IN MEAL PREPARATION

PRESIDENTIAL CAMPAIGN

FEATURING THE

New President ELECTRIC RANGE

SPONSORED by George A. Hughes—Father of the Electric Range, and chief executive of Hotpoint—the *President* stands as Hotpoint's ultimate achievement in Electric Range value, and comes as a culmination of thirty years of progress ..a fitting tribute to Mr. Hughes' steadfast leadership.

This range will pull a record ballot wherever value gets the vote. So don't delay—climb on the Hotpoint Profit Bandwagon *now!*

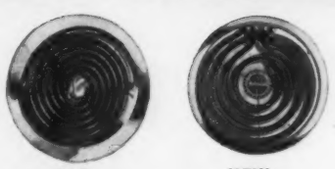
"America's choice for 1940" has these FEATURES:

- New streamlined design
- All-porcelain finish inside and out
- New, massive, streamlined Backsplasher
- New streamlined Handles of moulded white Plaskon
- New Indicating Switch Buttons
- New smartly styled Cooking Top Lamp
- New 3-heat 6-quart Thrift Cooker with Flavor-Seal Lid
- 3 New Calrod Surface Cooking Units (each with 5 Measured Heats)
- Oversized all purpose oven with 5 Measured Heats
- Three large utility drawers

See your distributor or write today for complete information. Edison General Electric Appliance Co., Inc., 5612 West Taylor Street, Chicago, Illinois.

It's a Presidential Year...
Make it your most profitable one

ONLY $129.95 LIST AT THE FACTORY
Freight and Installation Extra



OLD NEW

YOU CAN SEE THE DIFFERENCE

NEW CALROD

Cooking Units are faster, more efficient, more economical than ever.

Reduced coil length in the new Calrod provides faster heating; coils are self-cleaning. Be sure to get the *New Calrod Cooking Units.*

Leisure FOR Living
MORE FREE TIME FOR MOTHERS
THAT'S MY PARTY-PLATFORM!
My part in this program is to win the hearts of your neighbors and turn their attention to YOUR STORE.

WESTINGHOUSE FALL ACTIVITY

FOCUSED ON YOUR STORE

1. **NATIONAL ADVERTISING**
   13 color pages—to create acceptance for your Leisure Lines.
2. **MUSICAL AMERICANA**
   Plugging for you every Tuesday.
3. **DRAMATIC DISPLAYS**
   To put your store in the Leisure Line limelight.
4. **4-PAGE NEWSPAPER FLYER**
   Imprinted with your name.
5. **KEY CITY ADVERTISING**
   To add speed-power to your local campaign.
6. **LOCAL ADVERTISING**
   Points right to your store.

PLUGS *Leisure for Living* with a Dramatic, Volume-Building Program!

Never has there been a more dramatic theme! It emphasizes the emancipation women have sought for ages. It directs attention to the easier, more economical ways of living that electricity has made possible.

Thirteen color pages in four big national weeklies create acceptance for this *Leisure-Living* Theme. But that's only half the story. *Blondie*, of comic-strip fame, will lead the parade of prospects to your store. And here's how.

BLONDIE GOES TO LEISURELAND

Westinghouse has made available this give-away, traffic-building game. It's built around a favorite, comic-strip family; Blondie, Dagwood, Baby Dumpling, and Daisy! A brand-new game! Hilarious fun for old or young. *A game that will draw prospects right into your store.*

GET BEHIND THIS PROGRAM—*It starts September 24.* Ask your Westinghouse man. He has all the details. Or write direct to department 205.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
MERCHANDISING DIVISION MANSFIELD, OHIO

Tune in "Musical Americana," N. B. C. Network, Coast-to-Coast, every Tuesday evening

Westinghouse

THE *Leisure Line* OF *ELECTRIC* HOME APPLIANCES

HUBBARD Ribbed BRACES

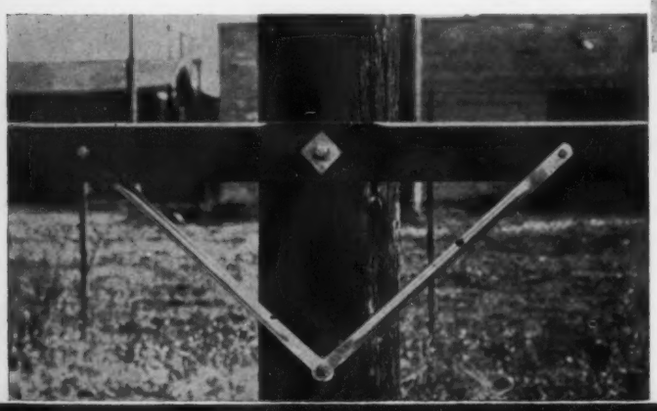
STAND OUT ALONE!

... IN WITHSTANDING THE MOST SEVERE STRESSES, STRAINS AND WEIGHT OF WINTER SNOWS AND FLOODS

- ★ TITANIC STRENGTH WITH NO ADDED WEIGHT
- ★ SPECIALLY TREATED FOR CORROSIVE RESISTANCE
- ★ PROVEN THROUGH SEVEREST WEATHER TESTS
- ★ ROUNDED CORNERS REDUCE INJURIES
- ★ LONGER TROUBLE-FREE SERVICE LIFE

★ Weather tested and time-proven, Hubbard Ribbed crossarm braces stand out with titanic strength—alone and unattended, day and night—in the face and fury of storms, floods and winds. Strong as the sinews and muscles on a towering giant's arms, they unfailingly support the greater weight of heavier loads, and withstand the terrific buffeting of high velocity gales.

Special center ribbing provides greatest structural strength with no added weight. Hubbard's pore-sealing process of hot double galvanizing provides positive insulation against rust and corrosion. Flat ends and rounded corners facilitate installation and reduce the possibility of injuries.



DAY and NIGHT

HUBBARD RIBBED CROSSARM BRACES CATALOG No. 8328

For greatest dependability, enduring trouble-free service and lowest maintenance cost, this winter and the year round—specify Hubbard RIBBED crossarm braces. Hubbard's 50 years of specialized study and experience give you pole line hardware which is the best by every test. Order from your nearest branch of the Graybar Electric Company or General Electric Supply Corporation.

HUBBARD

Hubbard and COMPANY

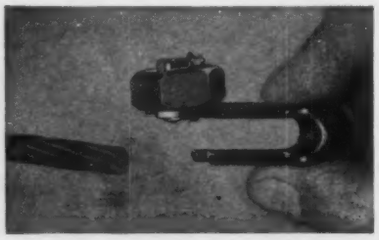
OAKLAND, CAL. PITTSBURGH CHICAGO

HUBBARD

THE HARDWARE MAKES THE LINE . . . HUBBARD MAKES THE HARDWARE

Nut Retainer (914)

A positive position nut retainer just presented by the Burndy Engineering Co. is being supplied on Burndy Servits and holds the nut-pressure bar assembly in any desired position in relation to the U-bolt. Thus, when the connector is being installed on the wire, the retainer will hold the nut-pressure bar assembly clear of the slot in the U-bolt, permitting easy installation of the Servit with only one hand. Once the connector is on the run conductor, the nut-pressure bar can be swung shut and the generous thread pilot will guide the nut on to the U-bolt threads, eliminating cross threading and jamming.



Reflector Coating (915)

A light-transforming reflector coating has been developed by the Continental Lithograph Corp., which corrects the color of the light-emission from fluorescent lamps for proper meat case lighting. Some installations of fluorescent lamps for inside lighting of meat cases have met with objection because of the color appearance of certain meats. Absorbing the near ultra-violet yellow and green radiations abundant in the emission from the fluorescent lamp, this new coating alters wavelengths and re-emits much of the energy as red light. Little loss of energy results. Test sheets are available to demonstrate this corrective function.

1941 Arvin Heaters (916)

New 1941 Arvin electric fan-forced circulating heaters are on their way, being backed by a national advertising and promotional campaign. The heaters circulate warm air completely by drawing the cold air from the floor, heating it, and fan-forcing it into the room. They convert 98% of electric current into circulating heat. The portable type can be used in any room with a 110 a.c. wall outlet. The new line includes a standard model and two deluxe models. Cabinets are of heavy gauge metal on rubber feet. All heaters have chrome grilles.

Tel-a-cook Lights (917)

Tel-a-cook lights, which have been used for some time to indicate readily the cooking temperature being used on deluxe G-E ranges, have been incorporated in the new automatic roaster just introduced by the G-E appliance and merchandise department. The complete range of cooking temperatures on the roaster, from 150 to 550 degrees, is accurately controlled by an automatic thermostat, and the Tel-a-cook lights in various colors tell at a glance at what degree the control has been placed.

Indirect Luminaire (918)

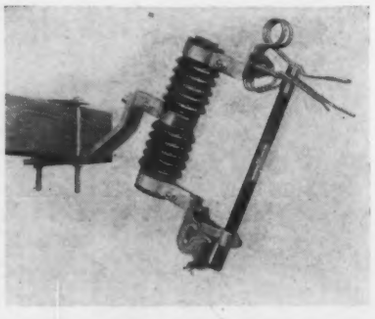
A new indirect luminaire offers fixture buyers an extremely shallow appearance with reflection and distribution of the light by a silvered glass reflector. Called the "Permaflector Luminaire No. N-593," this unit is of the luminous bowl type and is made of spun aluminum. Made by the Pittsburgh Reflector Co., it has an unusually shaped upper bowl mounted to trap a subordinate spill of light thereby creating a translucent effect which resembles tones of polished and satin aluminum.

Football Clock (919)

The "Bigtime" football clock, manufactured by the Sangamo Electric Co., eliminates guesswork with its stop watch action. Accepted as an official timer by many sectional athletic associations, this clock's second hand is driven from the tip, while the outside track is driven with a gear. Tip drive eliminates leverage against the hub in strong wind, a fault of most timers. It is operated by remote control from the timer's sideline station. An extension cord or permanent wiring may be used. Two types of controlling devices are available, one a pistol grip and the other a desk timer with two dials, necessary switches and signal lights.

Dropout Cutout (920)

A dropout cutout has been developed by the Pacific Electric Mfg. Corp. In this unit, the fuse holder drops out of contact when a short occurs, swinging to the open position. It has a single-piece insulator, solderless-type connectors and interchangeable lower hinge for mounting spare fuse holders, and is made in 5-kv., 7.5/12-Y kv. and 15-kv., 100 amp.



THE WHOLE STORY IN A NUT SHELL

Ward Leonard Rheostats cover a range from the small types for fractional horsepower motors to the largest multiple units to control the heavy current requirements of rolling mills. The Bulletins covering the types, drives, mountings and accessories of the Ward Leonard Line is the whole story of Rheostats "complete in a nutshell." Send for Rheostat data bulletins.

Send for bulletin of interest

WESTERN REPRESENTATIVES

Raymond Ackerman, 318 Dooly Block, Salt Lake City, Utah
Northwestern Agencies, 2411 First Avenue, Seattle, Wash.
A. R. Slimmen, 445 East 3rd Street, Los Angeles, Calif.
Electric Material Co., Inc., 163 2nd Street, San Francisco, Calif.

WARD LEONARD
48 SOUTH STREET MOUNT VERNON, N. Y.

ELECTRIC CONTROL DEVICES SINCE 1892

SHORT-CUT to system savings

Voltage Regulation
•
Load Division
•
System Stability
•
Short Circuit Analysis
•
System Operating Procedure
•
Related Protection

SYSTEMS "IN MINIATURE" ENABLE YOU TO KNOW...NOT GUESS...THE RIGHT ANSWERS TO THESE PROBLEMS

A "punchboard" with no blanks—that has paid off, in savings to power companies, in amounts up to $300,000!

The A-C Network Calculator—originated and perfected more than 10 years ago by Westinghouse—removes the element of chance from projected system changes and operating procedure. Its ability to reproduce complete systems and system conditions, in miniature, enables exact results to be foretold *before* investments are made to correct system weaknesses or to provide for increased system needs. Complicated problems are readily solved which otherwise could only be calculated by long, laborious methods if at all.

An A-C Network Calculator study is only one of the means by which Westinghouse equipment can help eliminate guesswork from system planning. Consult Westinghouse before you buy. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., Dept. 7-N.

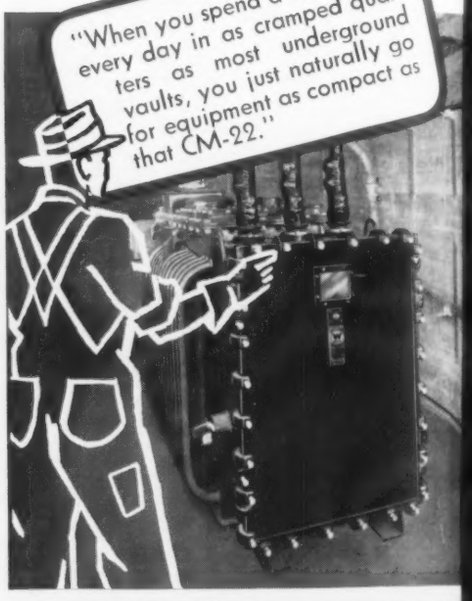
Westinghouse

A-C NETWORK CALCULATOR

RELATED PROTECTION . . . FROM

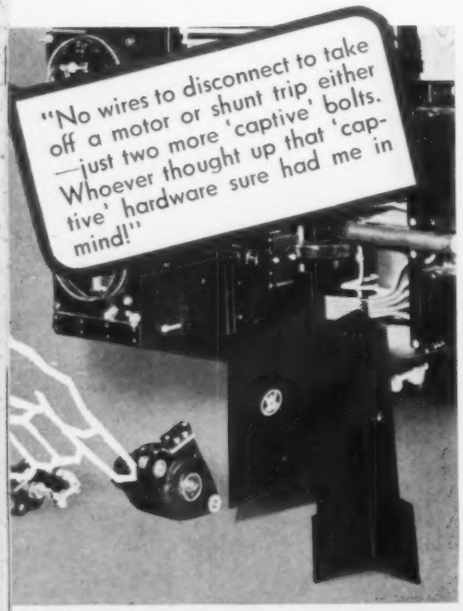
"ME?-..

"When you spend a big part of every day in as cramped quarters as most underground vaults, you just naturally go for equipment as compact as that CM-22."

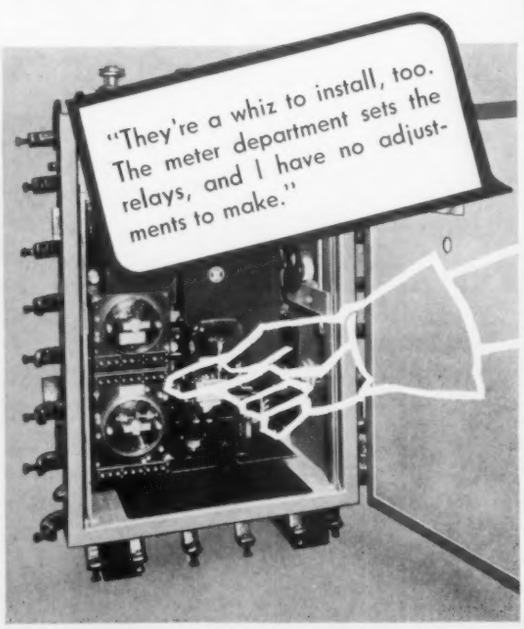


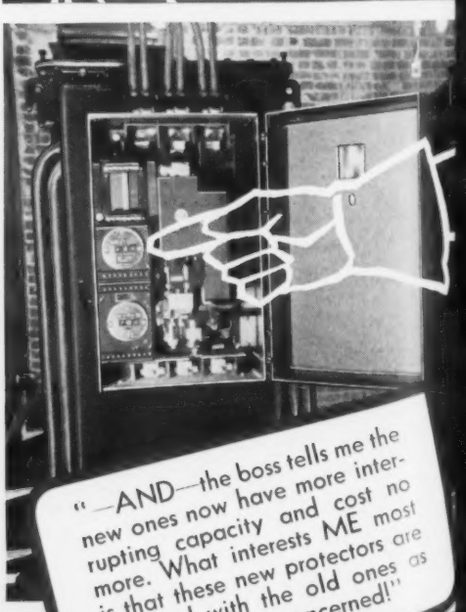
"here's why..."

"No wires to disconnect to take off a motor or shunt trip either—just two more 'captive' bolts. Whoever thought up that 'captive' hardware sure had me in mind!"



"They're a whiz to install, too. The meter department sets the relays, and I have no adjustments to make."





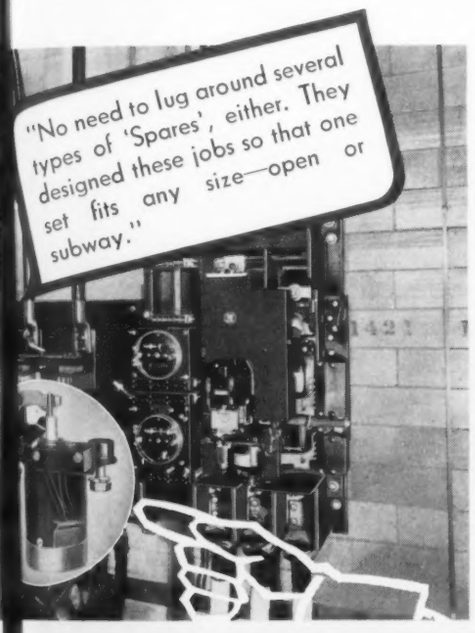
"—AND—the boss tells me the new ones now have more interrupting capacity and cost no more. What interests ME most is that these new protectors are identical with the old ones as far as my job is concerned!"

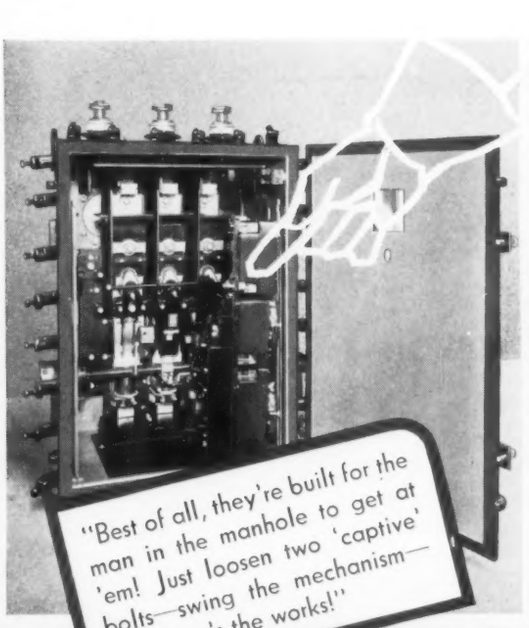
WESTINGHOUSE ELECTRIC

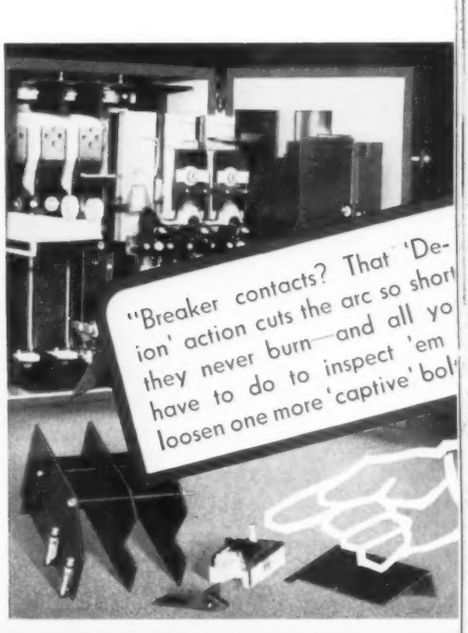
Westinghouse

GENERATING STATION TO LAMP SOCKET

I'll take Westinghouse Network Protectors!"

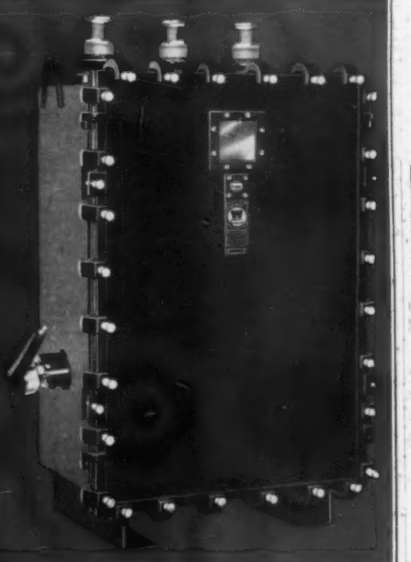



"Best of all, they're built for the man in the manhole to get at 'em! Just loosen two 'captive' bolts—swing the mechanism—and there's the works!"


"Breaker contacts? That 'De-ion' action cuts the arc so short they never burn—and all yo have to do to inspect 'em loosen one more 'captive' bol'

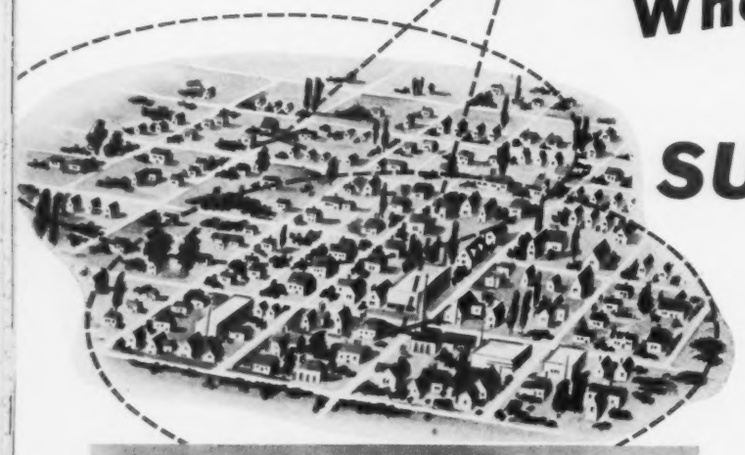
The "man in the manhole" and power company engineers alike agree on Westinghouse CM-22 Network Protectors . . . because they were designed to the operating department's ideals.

Addition of 2,500 and 3,000 ampere ratings for open or vault type units, with interrupting capacities up to 40,000 amperes, now makes the compact CM-22 line available in the entire range of ratings from 800 amperes, 250 volts, to 3,000 amperes, 250 volts. Why not get the full story? Ask your Westinghouse representative or write Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., Dept. 7-N.



Network Protectors

When load centers move . . . MOVE SUBSTATIONS TOO!



ENDS "EYESORES"—Westinghouse Outdoor Unit Substations eliminate costly and unsightly large structures, and enable neat installation of stations in residential sections.

Unit substations . . . compact . . . complete . . . unobtrusive . . . easily moved . . . simplify radial or primary network power distribution. Installation costs are reduced; substations can be located close to actual load centers; entire units can be moved, if necessary, to new locations as load centers shift. Additions can readily be made.

Westinghouse unit substations are designed in types for location, outdoors or indoors, . . . switchgear of the metal-clad or switch house type for outdoor application; metal-clad or cubicle construction for indoors. Completely factory assembled and tested, units provide safe and coordinated construction.

Valuable suggestions on improvements in power distribution possible with unit substations, together with more complete details, are contained in Westinghouse Booklet B-2093. Write for your copy. Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., Dept. 7-N.

J-60420

W WESTINGHOUSE ELECTRIC

Westinghouse

UNIT SUBSTATIONS

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0420

Polaroid Study Lamp (921)

Polaroid Corp. is now manufacturing for the first time a popularly priced Polaroid study lamp that gives promise to be the

modern successor to the old-fashioned type of "gooseneck" lamp. Designed to fit a student's budget, the new lamp offers glareless Polaroid light for only $2.95. A walnut-finished Bakelite stem and base with a shining copper trim, and an eggshell-brown parchment type shade combine to make a sturdy lamp that is both functional and pleasing in appearance. Light from a hundred-watt bulb is projected through the Polaroid anti-glare material by a mirror-like reflector under the lamp shade.

G-E "Imperial" Range (922)

Primarily for the electric kitchen which requires the finest available equipment or must feed a large family in the speediest and most modern manner, a new electric range, the "Imperial 60," has been introduced by the G-E appliance and merchandise department. The new extra-capacity range, with its double complement of surface units and two extra large ovens, is literally the "flagship of the entire G-E range line," replacing a similar "Imperial" model which, like the new one, was styled by Ray Patten, prominent industrial designer. In addition to their extra large capacity and de luxe fittings, the "Imperial" ranges enjoy the distinction of winning for Patten a few months ago the American Design Award sponsored by Lord

and Taylor, large New York department store. Its one-piece top and backsplasher of Monel metal is 60 in. long, with generous surface areas between the two groups of cooking units allowing for the efficient handling of pans and dishes in the preparation of a meal. Oven and warming compartment doors and storage drawers are fitted with special de luxe hardware. Central feature of the front of the range is the large control panel, with its white Textolite switch buttons, time signal, and two appliance receptacles.

New Telechron Designs (923)

The new Telechron designs for fall are out with models for every room in wood, plastic, onyx or glass. A twelve-clock sales plan is being introduced which will include a metal and wood display stand. Circulars and national advertising will also back the advent of these additions to the Telechron Electric clock line, which lists an automatic calendar clock "The Instructor" (illustrated) in a brown wood case. It has a calendar dial with red characters and a cream color background.

Silex Steam (924)

An automatic electric steam iron has been put on the market bv The Silex Co. with a perfected switch for on or off steam control. The iron may be used with steam at an extremely wide range of temperatures, or it may be used as a dry iron with rougher materials. A built-in safety valve assures the housewife absolute safety. It is light in weight, only 3¾ lb. and combined with the new Silex No-Lift Roller Bearing iron stand, cuts wash day work less than half. Equipped with a 1000-watt heating element. An added safety factor while ironing is the burn-proof metal gasket between the sole plate and the metal reservoir.

Micrometer (925)

A new micrometer adjusting knob and indicator has been developed and is incorporated in the latest type of automatic reset timers and time delay relays manufactured

by The R. W. Cramer Co., Inc. Principal features of the new device are the simplicity, neatness of appearance, ruggedness of the mechanical assembly and the ease with which it permits accurate adjustment of the timer settings. Users of these improved timers will be impressed by the accuracy of setting, flexibility and ease of adjustment, the readiness with which minute changes can be made, as well as the neat appearance and compactness of the units. In other words, timers which formerly ranked as excellent tools or equipment are now lifted to the rank of laboratory instruments.

Here's How

to install

Service Entrance Cable

Faster—More Economically

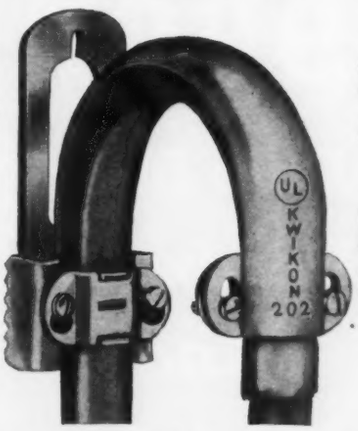
use

KWIKON No. 202

Service Cable Head

only 20c each

in lots of 50 or more



Economy and an easier and faster installation have made Kwikon No. 202 a national favorite. Improved by the new hanger type back, which makes the assembly and installation so much easier, it comes to you at no additional cost.

To be completely satisfied on your next Service Cable Head requirements, use Kwikon No. 202.

Approved by Underwriters' Laboratories, Inc.

KWIKON CO. 626 W. JACKSON CHICAGO, ILLINOIS

PRODUCT DATA

Keep Posted for 1c

Your being right up-to-the-minute may have an important bearing on your success. New developments are appearing daily in your field—tools to help you do a better job. Are you abreast of them? You fall back a step when the other fellow is well informed about a subject of which you are ignorant. Manufacturers' publications are a quick, efficient way for you to keep posted on current events in your field.

Isn't it a bargain to invest 1c (the cost of a postcard) to help earning power to which you look forward? American industry is offering a remarkable service—free. ELECTRICAL WEST makes it easy for you to enjoy this service for your own. Check and mail the coupon below. That's all you have to do to help yourself toward better performance and greater rewards.

Wiring Handbook (926)

A new manual on modern home wiring practices assuring electrical adequacy, called the "G-E Home Wiring Handbook," has just been published by the wiring materials section of the General Electric appliance and merchandise dept. Available to either contractor or ultimate consumer who desires practical and complete information on adequate home wiring, the new 24-page manual is completely factual. It contains a detailed description of G-E home wiring methods, a guide for checking and writing specifications, and material specifications for home wiring, as well as several suggested ways of proving the adequacy of the installation afterwards, and a series of convenient tables. Under the section dealing with wiring requirements for homes, the advantages of the feeder-type of system are explained with simple diagrams and cutaway drawings. Such things as radial wiring and the number and type of circuits are discussed. Eight different methods of installing wiring are illustrated. A completely illustrated section shows the various G-E wiring materials such as types of wire and conduit switches, outlets, and circuit breakers.

Meters (927)

An attractive and educational 27-page illustrated plastic-bound booklet on meters entitled "Key to Long Time Meter Value" has been issued by Westinghouse. By means of a series of illustrations, a watthour meter is completely dissembled and discussed from mechanical and electrical viewpoints. Construction features are brought out in a clear-cut fashion before the meter is assembled again. Three pages of application data for single and polyphase watthour meters with circuit and vector diagrams and formulae are included in the booklet. A large folding page showing over 80 different types of Westinghouse meters, together with a schematic circuit diagram and line of application for each concludes this publication.

Condensing Units (928)

A 56-page booklet entitled "Low Cost, Dependable Condensing Units" has just been released by the General Electric air conditioning and commercial refrigeration dept. It describes condensing units from 5 to 60 h.p. for both refrigeration and air conditioning installations. Prepared especially for engineers, architects and contractors, the booklet is largely devoted to performance and application data, compressor accessories, instructions for capacity modulation, multiple unit operation, and other engineering information needed in the design of large-scale refrigeration and air conditioning systems.

Fluorescent Mazda Lamps (929)

An 8-page illustrated folder describing Type F fluorescent Mazda lamps and their application for seeing, selling and decoration has just been issued by Westinghouse. Operating principle of the fluorescent lamp is described, and complete technical data on the line of type F lamps is given in a handy table. Advantages of fluorescent lighting are outlined, each advantage being illustrated with an explanatory sketch. A great number of commercial and industrial applications are suggested, and 3 pages of pictures showing different types of fluorescent installations are shown. The folder also includes information on auxiliary equipments for the lamps such as starters, ballasts, compensators, and capacitors.

Fluorescent Fixtures (930)

Practically every possible type of fixture for use with fluorescent lamps is included in the new Daybrite Fluorescent catalog No. 112. The company's complete line of fluorescent fixtures is presented in 48 illustrated pages which show each unit, give diagrams and other pertinent information concerning installation and maintenance.

Switch-gear (931)

A new catalog illustrates and describes Low Voltage Metal-Enclosed Air Circuit Breaker Switch-gear made by the Roller Smith Co. One page shows a breaker compartment with breaker and telescoping rails fully withdrawn. General specifications, housing construction, drawout features and information required for proposal or order given.

Colt Catalogs (932)

Recent Colt Patent Fire Arms Mfg. Co.'s bulletins are a listing of the entire line of Colt Electrical Products, with 84 pages of description, including Safety Switches, Multi-Breakers, Service Equipment, Fuses and a complete listing of Sizes "0" and "1" Motor Control Units. (2) A complete description of the new Colt Manual Motor Starters, including list prices, general information and application data. (3) A complete description of the new across-the-line type Colt Magnetic Motor Starters. Also described in this bulletin are the new Colt Overload Relays and the new Colt Push Button Stations.

Use More
DROP FORGED
Pole Line Hardware And Obtain
★
1 Plus Strength in Lighter Sectional Thicknesses.
2 Uniform Physical Structure, Size and Shape.
3 Freedom from Concealed Defects.
4 Extra Margin of Safety.
Forgings offer many direct and indirect economies. Consult makers of drop forged pole line hardware.
DROP FORGING ASSOCIATION
605 HANNA BUILDING • CLEVELAND, OHIO

HOTPOINT'S STANDARD
OF LEADERSHIP IN WATER HEATING
DID NOT HAPPEN BY ACCIDENT

WHY HOTPOINT SETS THE STANDARD

Calrod, Hotpoint's airtight heating unit, is immersed directly in the water inside the tank. All heat generated is delivered to the water. No waste. No flame. No fire hazard.

New **"Safe-T-Seal"** Bond for Calrod is a non-conducting material for sealing Calrod water heating units. It greatly increases the life of the unit and reduces possibility of interruptions in water heater service.

Thermosnap, Hotpoint's automatic temperature control is the "brain" of the water heater. Automatically turns the heating units on and off as necessary. It makes Hotpoint *safely* automatic.

There are 5 good reasons why Hotpoint has been accepted as the *standard* of leadership in electric water heating—both by the industry and the public.

1 Leadership in Design

Hotpoint has pioneered and improved the design of electric water heaters to bring about the present high standards of efficiency.

2 Leadership in Manufacture

As America's largest producer of electric water heaters, Hotpoint maintains leadership through constant research, improved methods, skilled craftsmanship.

3 Leadership in Marketing

Hotpoint has accepted the charge of sighting logical markets for electric water heating and laying plans for exploiting the opportunities.

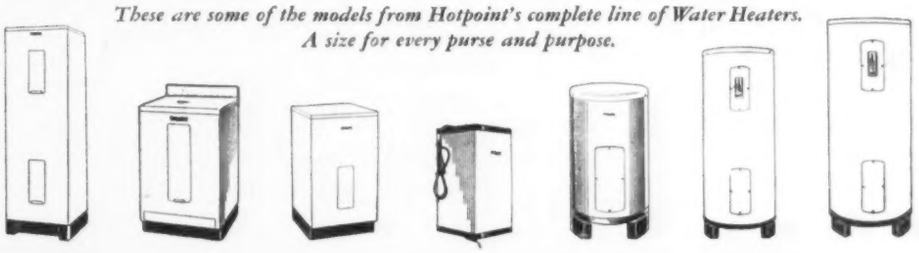
4 Leadership in Advertising

Sensing a coming boom in home building, Hotpoint launched, in 1940, the first national advertising campaign for electric water heaters. This advertising was directed to the most logical water heater prospects in the world—the people who are planning to build or modernize their homes. Already this advertising has developed hundreds of prospects for Hotpoint retailers and utility customers.

5 Leadership in Promotions

has fallen to Hotpoint as a natural result of our having a bigger stake in the water heater business than any other manufacturer. Look to Hotpoint first for the latest in promotions.

These are some of the models from Hotpoint's complete line of Water Heaters. A size for every purse and purpose.



EDISON GENERAL ELECTRIC APPLIANCE COMPANY, INC., 5612 W. Taylor St., Chicago, Ill.

AUTOMATIC ELECTRIC **Hotpoint** WATER HEATERS

ELECTRIC RANGES • REFRIGERATORS • WASHERS AND IRONERS • CLOTHES DRYERS • DISHWASHER-SINKS

Turbo-Blowers (933)

Allis-Chalmers Mfg. Co. has issued a brand-new bulletin on Single-Stage Turbo-Blowers for use throughout industry wherever large volumes of air or gas are needed at pressures from one to 6.25 lb. It gives the advantages of turbo-blowers, their method of operation and characteristics. It illustrates and describes various single-stage motor and mechanically driven blowers including geared-head, overhung and pedestal types, as well as double inlet blowers for large volumes. Several pages are devoted to blower accessories such as blast gates, constant air weight control for cupolas, speed governors, etc.

Wire Rope Connectors (934)

Described in a new 8-page bulletin are the improved Electroline-Fiege wire rope connectors with built-in vibration-damping design. These connectors develop full line strength, yet grip the cable with "feathered-off" compression which takes up vibratory stresses and prevents crystallization at the point of connection, thus greatly increasing rope life. Installation meth ods are described and the several corrosion-resistant finishes and types, available in various sizes, are listed.

TEAM WORK
on your
FAST FREIGHT
From the East
SHIP VIA NATIONAL CARLOADING
A Pacific buyer specifies NATIONAL on a rush shipment from the East.
Next day the shipment is picked up at the Eastern source.
Consolidated into a NATIONAL daily "through" car, it leaves promptly for the Coast.
Delivered on time to the customer's door! Let NATIONAL "Teamwork" save you time and money. Rates on request.

NATIONAL CARLOADING CORP.

Offices and Agents in All Principal Cities.

Switchboard Instruments (935)

A 16 page illustrated catalog of rectangular case switchboard instruments, types HA, HX, HY, and HZ is announced by Westinghouse Electric & Mfg. Co. These instruments are especially designed for flush and projection mounting on switchboards, panels, control desks, or similar apparatus. The catalog explains features such as high overload capacity, wide frequency tolerance, low burden, uniform case size and numerous others. Construction and operating principles are fully described. Different types are illustrated, including the triplex instruments. Complete dimension, mechanical, and electrical data are given.

Highway Design (936)

"Modern Designs for Streets and Highways" is the title of a new catalog issued by The Union Metal Mfg. Co. More than 1,400 different design numbers are illustrated and listed. The catalog has been compiled in the manner of an engineering manual — all illustrations are completely dimensioned and the tables on each page carry supplemental information with respect to pole size, bracket spread, foundation data, etc. The designs illustrated employ both the plain round and fluted type pole. They can be furnished with or without an ornamental transformer base, while the varying bracket spreads permit placing the luminaire over the roadway at the proper heights to obtain the best distribution of light.

Synchronous Motors (937)

A new 8-page publication on automatic control for synchronous motors, published by the Electric Machinery Mfg. Co., describes Polarized Field Frequency Automatic Control for synchronous motors. Function and construction of the control parts are explained, and connections of a typical control are illustrated.

NEW BOOKS

VITAL STATISTICS OF 188 OPERATING UTILITIES of registered utility holding companies for a 10-year period 1930-39 inclusive have been compiled by the Securities and Exchange Commission and published in a 206-page volume now available free of charge from the Public Utilities Division. The tables show operating revenues, gross income, fixed charges, preferred dividends, common stock dividends, capitalization, surplus, depreciation both as charged to income and as allowed for taxes, dividend arrearages, and similar data for each company. The book is the work of Clarence A. Turner of SEC's Public Utilities Division, and is the outgrowth of a request made last November by then Commissioner George C. Mathews for these data on all companies with dividend arrearages. Several companies commented upon the differences in depreciation figures for tax purposes and as charged to income, pointing out the tax calculations result from arbitrary regulations of the Treasury, and have no true relation to property. These comments are printed without interpretation.

ELECTRIC CIRCUIT, by Members of the Staff of Massachusetts Institute of Technology, published by John Wiley & Sons, $7.50. For some years the staff at MIT has been endeavoring to revise its entire method of presenting electrical engineering, an endeavor, which, among other things, is planned to culminate in a group of new texts. Electric Circuits is the first of these and, according to the authors, is an attempt "to appeal to the student of ordinary preparation and also provide a depth and rigour challenging to the exceptional student and acceptable to the advanced scholar." Needless to say, a work of this type is exceedingly exhaustive. The book is 782 pages long. Other volumes in preparation by the Electrical Engineering Department at MIT include Magnetic Materials, Transformers, Electronics, Electrical Machinery.

SAVE TIME! USE THIS COUPON

To keep posted, simply circle the items in which you are interested, cut out the coupon (it can be pasted on the back of a postcard) and mail to:

ELECTRICAL WEST, 68 Post St., San Francisco, California
Please send me the following CIRCLED items:

901	902	903	904	905	906	907	908	909	910
911	912	913	914	915	916	917	918	919	920
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931	932	933	934	935	936	937			

Name ..... Title* .....

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* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

ARVIN

ELECTRIC FAN-FORCED

Circulating Heaters

These Arvin Profit Makers are selling faster every year. Sales jumped 65% last year. And this year—they'll sell faster than ever with an even more aggressive consumer advertising campaign in these leading national magazines.

● Chilly weather makes hot prospects—so profit from the early demand by ordering from your Arvin jobber now. Ask him for the free sales-building window-counter card and consumer folders.

Three compact models, beautifully designed and finished. They circulate as they heat. Plug into any AC wall outlet. Safe with children. Efficient and economical.

Approved by Underwriters' Laboratories and Good Housekeeping Institute

NOBLITT-SPARKS INDUSTRIES, Inc., COLUMBUS, INDIANA

Tested and Approved by Good Housekeeping Institute

Just What Your Customers Need for:

Bathrooms • Nurseries • Dens • Guest-Rooms • Game-Rooms • Sun-Rooms • Trailers and Camp Cottages • Invalids' Rooms in Homes or Hospitals • Small Offices and Ticket Booths • Hair and Clothes Drying • Bath Houses • Photographers' Drying Rooms.

Selling Points for You to Use:

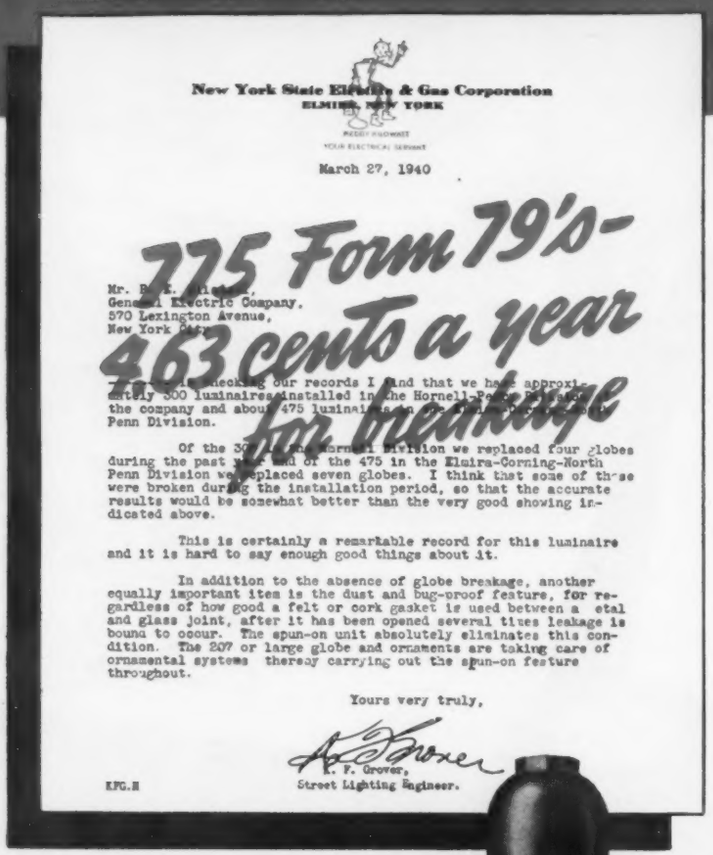
Circulates heat by using fan-distributing principle . . . Warms air completely by drawing cold air from floor, heating it and fan-forcing it into the room . . . Safe with children because heating element and fan are enclosed . . . Won't burn rug if accidentally upset . . . Doesn't interfere with radio.

DELUXE MODEL 201 Tan and Brown Morocco Finish. Chromium Grille. Toe Switch and Glow Light. Size 11¾" high, 10⅞" by 6⅝" at base. . . . . **$9.50 LIST**

STANDARD MODEL 101 Two-tone Green Enamel Finish Chrome Grille. Carrying handle recessed in back of case. Size 10" high, 9¾" by 6⅛" at base . . . . . **$7.50 LIST**

DELUXE MODEL 201A Ivory and Maroon Enamel Finish. Chromium Grille. Toe Switch and Glow Light. Size 11¾" high, 10⅞" by 6⅝" at base . . . . . **$10.50 LIST**

If Glassware Breakage Costs You More Than 10 Cents a Year...



New York State Electric & Gas Corporation
ELMIRA, NEW YORK

March 27, 1940

775 Form 79's—463 cents a year for breakage

Mr. [illegible]
General Electric Company,
570 Lexington Avenue,
New York City.

After checking our records I find that we have approximately 500 luminaires installed in the Hornell-Corning Division of the company and about 475 luminaires in the Elmira-Corning-North Penn Division.

Of the 30 in the Hornell Division we replaced four globes during the past year and of the 475 in the Elmira-Corning-North Penn Division we replaced seven globes. I think that some of these were broken during the installation period, so that the accurate results would be somewhat better than the very good showing indicated above.

This is certainly a remarkable record for this luminaire and it is hard to say enough good things about it.

In addition to the absence of globe breakage, another equally important item is the dust and bug-proof feature, for regardless of how good a felt or cork gasket is used between a metal and glass joint, after it has been opened several times leakage is bound to occur. The spun-on unit absolutely eliminates this condition. The 207 or large globe and ornaments are taking care of ornamental systems thereby carrying out the spun-on feature throughout.

Yours very truly,

K. F. Grover,
Street Lighting Engineer.

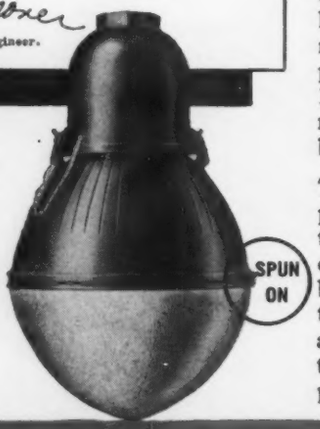
KFG.H

IT WILL PAY YOU to Look Into the Form 79 Luminaire

MORE than five years ago when street-lighting glassware breakage was a regular occurrence, General Electric introduced the Form 79 luminaire with the spun-on globe and said—"glassware replacement will be about 10 cents a year." Apparently, we were too conservative. Mr. K. F. Grover, Street Lighting Engineer for the New York State Electric and Gas Corporation at Elmira, reports 11 globe replacements with 775 luminaires—only ***4.63 cents per luminaire a year.***

The experience of the New York State Electric and Gas Corporation typifies that of other operating companies. Another Eastern utility, for example, has 1100 Form 79 luminaires installed and has had only 23 replacements since the installation was completed in June, 1938. A utility in Illinois has 134 Form 79's and recently asked for information on one replacement globe—their first breakage in three years.

These low breakage records were made possible by spinning the aluminum reflector to the globe, which protects the edge against chipping and damage when the luminaire is being relamped. Pressed glassware of greater than ordinary thickness and uniformity now assures even greater mechanical strength, and the smooth-finished, pressed edge resists chipping due to handling and temperature changes.



The Form 79 costs less than two thirds as much as the best previous luminaire and puts 70 to 80 per cent more light on the roadway. More light on the pavement, lower initial cost with little maintenance, freedom from dust and insects—that's why the Form 79 luminaire is first choice on America's streets and highways. Are you using them? General Electric, Schenectady, New York.

GENERAL ELECTRIC

For Better Service—

INSTALL TRICO REG. U.S. PAT. OFF.

RENEWABLE FUSES
With the famous Powder-Packed Element

KLIPLOK CLAMPS
Lock fuses and clips together

KANTARK FUSES
With genuine fibre tubes (not paper)

COLORTOP PLUG FUSES
The color tells the size

FUSE PULLERS
Pull and replace fuses safely

GLASS OILERS
For motors, line shafts, solid bearings etc

UNBREAKABLE OILERS
"Opto-Matic" Constant level type
Gravity Feed type

WRITE FOR FOLDER CPF-300

TRICO FUSE MFG. CO., Milwaukee, Wis.

M. L. Woodard, 367 9th St., San Francisco
W. E. Young Co., 1944 Broadway, Denver

COMBINES ECONOMY WITH SPEED

The New CHROMALOX
Super-speed range unit

Cooks by direct metal-to-metal contact between the all-flat top and the utensil bottom.

Every heat that is needed and the right cooking area for every size utensil.

Sell Chromalox-equipped ranges. Use these units for replacements—they fit all ranges.

"How to Sell More Ranges"—tells the whole story—write for your copy today.

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SCANNING THE MAGAZINES

American Industry

"What Industry Can Do For America," *Factory*, August—A special 308-page issue devoted to the study of American industrial conditions and their background. Seven distinct and illuminating sections make this issue a real contribution toward the education of men of industry in a national crisis.

Rural Power

"More Power to the Farmer," *Reader's Digest*, August, p. 58—An amusing article on the introduction and the advance of electricity in the rural areas of America. The cooperation of REA in this progress is outlined.

Modern Lighting

"Modernized Lighting Aids Office Work at Standard Oil," *American Business*, August, p. 32—A story of the installation of 3,700 new lighting fixtures in Standard Oil's four principal office buildings in San Francisco and Los Angeles. New transformers, switchboards and feeders also share the limelight in this modernization which was likewise discussed in the August issue of ELECTRICAL WEST, p. 55.

Protective Lighting

"Protective Lighting—A Reviving Market," by Glenn G. Bobst—*Electrical Contracting*, August, p. 16.—The spreading world conflict and its effect in this country has made it necessary for industry to look toward light again as a means of property protection at night. This article covers this battle of private industry vs. sabotage.

Defense Program

"National Defense Construction," by Laurence Davis, *Qualified Contractor*, August, p. 9.—The general manager of NECA explains his association's action to secure amendments to Navy and Army Cost-Plus-a-Fixed Fee Contracts to protect interests of specialized contractors.

Sales Training

"Retail Fraternity" by Eldridge Peterson. *Printer's Ink*, July 26, p. 69—Clear explanation of the why's and wherefore's of the General Electric Retail Development League, how the local chapters are formed, and how members (salesmen) are helped to greater personal success and profit.

Hot Water

"Water Heating Important Source of Utility Income" by R. E. Caywood and E. E. Sprague, *Electrical World*, August 10, p. 58. Prize-winning EEI-NEMA paper which shows the potential revenue, the effect of water heating load on the distribution system and the scope of modern water heating rates.

Bottled Gas Competition

"Bottle Gas, a Competitor to Rural Electricity," *Electrical Merchandising*, August, p. 23—A thorough article on this situation, giving definite figures, such as comporative costs, tests, etc.

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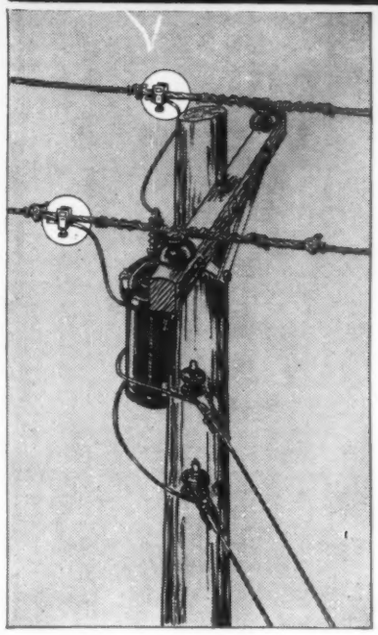

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ELECTRA'S HUSBAND

Not By Light Alone

"AT OUR women's club today, Mrs. —— gave me quite a letdown on this Better Light—Better Sight," said Electra, teasingly, as we sat at dinner one night with a guest who is in lighting educational work. "She said the medical profession thought it all a commercial enterprise of the power companies."

"Maybe the doctors think we're muscling in on their commercial enterprise," I mused. Our guest rose to the bait like the enthusiast for light that he is.

"Let me tell you of a true incident," he said, "that came about as a result of the lighting and seeing conferences we've been presenting to electrical workers unions. The other night at the Oakland union hall, one of the members came up to me and said:

" 'I came early purposely tonight to talk to you, because something has just happened that makes me feel pretty good, and I want to pass it on to you. A few months ago I was sent out to a home in East Oakland to wire in some convenience outlets. While I was working in the house, there was a young girl in and out of the room, toying with my tools, and one thing or another, and finally I said to her, "Why aren't you in school today?" She replied—"Aw, I don't like to go to school." Then the mother spoke up and said, "No, we have had trouble in keeping her in school; she should be in higher grades but she doesn't seem to be able to get along and the children tease her about it and we are just having an awful time. We have taken her to the doctor and the doctor says she is perfectly normal in every way, but it is perhaps just that she doesn't like school and she may get over it."

" 'I went along about my work and finally I noticed that this little girl was sitting in a chair looking at a picture book and she had that book drawn up so close to her eyes that it almost touched her nose. I immediately remembered your lecture on eyes and how they see, and I remembered that you demonstrated to us how a distance of 14 to 16 inches from the face was the normal distance for reading.

" 'When the mother came in the room again, I took occasion to call her attention to the child's position in reading, and told her that if she did not mind my opening up the subject again, I would like to tell her that we as electricians not only are interested in just putting wires in a place, but we learn all we can about what electricity and electrical circuits can do to help people, and one of the things we are learning at the present time is about light and lighting. We are having a course given to us out at our union hall from a man who is thoroughly conversant with the whole subject. He made a demonstration to us the other night showing that when a young person holds a book as close to his eyes as that little girl is, that either there is not enough light on the book or there is something wrong with the eyes. This little girl, sitting there with her back to the window seemingly has plenty of light on the book, so it might be that there is something wrong with the eyes.

" 'The lady then replied, "Well, why do you suppose our doctor didn't tell us that?" I replied that I could not answer that. However, I continued and told her when I read this is where I hold my reading matter, and then I held my hand at a normal position, which is about 14 or 16 inches from my face. Then I asked her where she held a book when she read and she picked up the same book that the child was looking at and she automatically held it in a normal position.

" 'Then she said, "Well, maybe there is something wrong with her eyes. When my little boy comes home from school I am going to see where he holds a book when reading and then when my husband comes home I am going to see where he holds his newspaper and if we all hold it in this position I am going to have the little girl's eyes examined."

" 'That was as far as I went at that particular time, and just the other night someone called me on the phone at my home and said, "I am the lady in whose home you placed some outlets a few months ago and talked to me about my little girl's eyes; do you remember?" I replied that I did remember. "Well," she said, "I had no way of knowing where I could get you, but I knew the firm who did this wiring for us and I called them and asked them who you were and that is how I got your phone number."

" 'Then she said, "I just want to tell you how pleased we are that you called our attention to our little girl's eyes. We took her to an eye doctor and had her eyes examined. She had a very exaggerated case of short-sightedness. He prescribed the proper glasses for her and she is now back in school and has caught up with her classes. She is in classes with children of similar age and is going to school every day and is very happy, and we want you to know that we appreciate your giving us this information.' "

"That man was just happy enough about this to tell me. So you see," said our guest, "it isn't by light alone—even among our electricians, that the Better Light—Better Sight program helps."

NOT FOR Electra's ears this story. By correspondence I learned that the problem of securing and holding attention of officials and employees of all departments has been solved in the Big Bend division of the Washington Water Power Co. Whether the subject is one of public relations or load building, Big Bend's sure-fire method, which is called "Nature's Compulsion," knows no favorites and catches the eye of proud and humble alike. No more is it necessary to circularize employees with urgent bulletins, printed announcements or fake telegrams.

"Nature's Compulsion" solves all that. In the quiet and seclusion of men's and women's wash rooms, on the wall, level with the visitor's eye, bulletin boards have been installed and announcements are regularly posted. According to peculiarities of diet, everyone from janitor to department head, is forced once a day or oftener to relax and read, or choose the alternative of remaining from three to 60 minutes with both eyes shut. All employees are now conversant with all programs. True frequent checks must be made to oust literature that accumulates to compete for the one-time honors of the mail order catalogs. But if these occasional periodicals are carted away, attention is quickly spotted on the information that will be more profitable. So far as is known there has been no ruling on this particular technique by any federal agency that supervises the passing on of information to employees.

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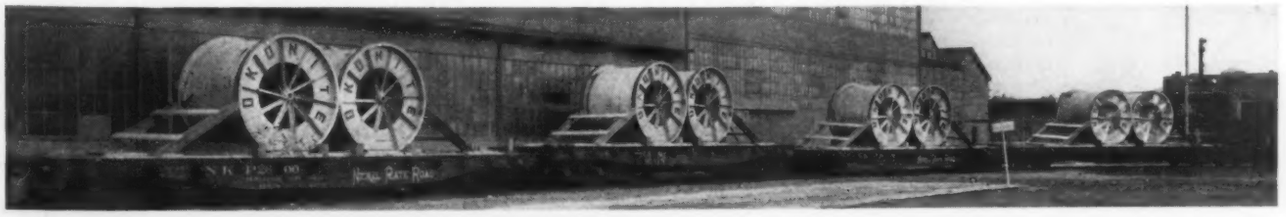

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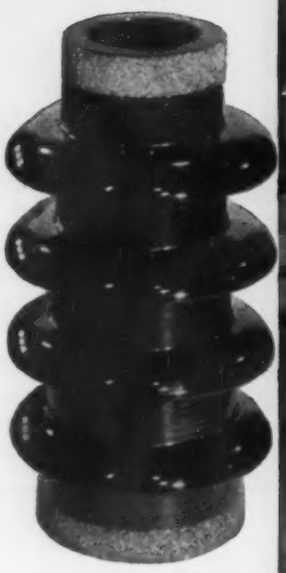

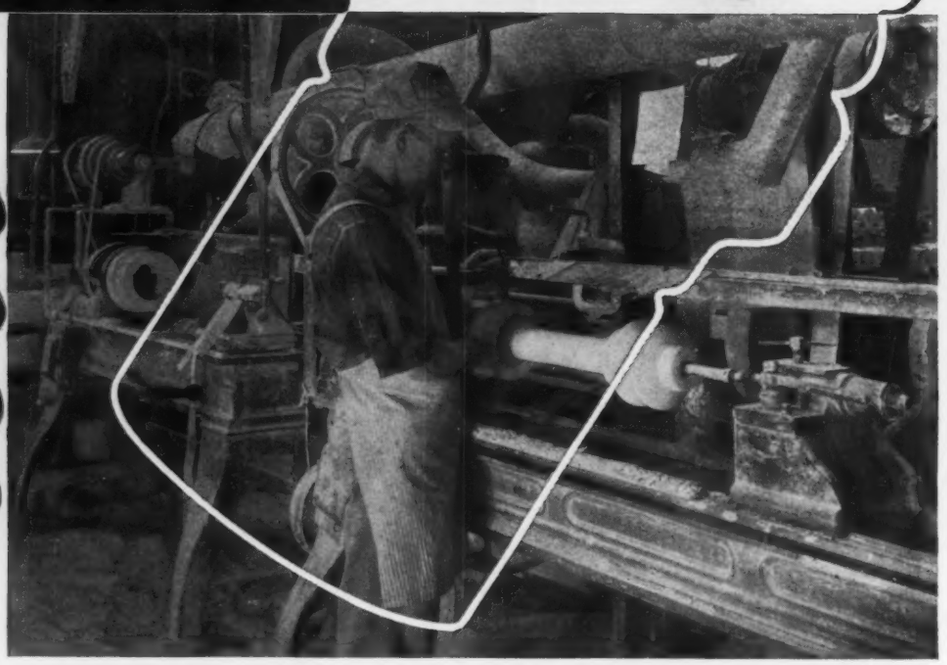

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BLACK LIGHT

By F. M. Falge

"BLACK LIGHT," a term used to denote the fluorescing of certain substances when exposed to near ultraviolet light with visible light as a result, is rapidly establishing itself in many fields. Fluorescence examination using an extremely powerful source of short-wave ultraviolet radiations is being applied to crime detection, scientific analysis, industrial comparisons and sampling. Black light and fluorescent paints and dyes are being used in sign sketch work, advertising displays, cafe decoration, laundry marking and even for the lighting of aeroplane instrument panels. In at least one instance it was used in the movies—in Paramount's "Dr. Cyclops" in Technicolor, a man was turned into a skeleton by black light.

Theaters, however, have assumed a commanding lead in the application of this new development in lighting technique. Since the author's article on this subject about a year ago*, the Los Angeles area has witnessed the application of black light to over a dozen theaters. The Keese Engineering Co., working with the perfected paints and other fluorescent materials of the Continental Lithograph Co. of Cleveland, and new light sources developed by the General Electric Co., has taken the initiative in theater work and has produced an extensive line of equipments for directing and controlling black light.

The first two theaters to use black light for auditorium lighting were opened about the same time. The Lido Theater of Newport Beach with a black light installation made by B. F. Shearer Co. of Los Angeles, opened Thanksgiving Day, 1939; the Fox West Coast Academy Theater followed during the Christmas Holidays last year. The Academy installation was made by the National Theater Supply Co. In the case of both theaters the Keese Engineering Co. supplied equipment and acted as consultant.

Since that time many important improvements have been developed and are being utilized in newer theaters. For example, the Academy Theater has been used by Messrs. McCullough and Banteau of Fox West Coast as a laboratory to determine the most satisfactory and economical method of lighting for other theaters in the chain. As a result black lighting has been placed in the Tower Theater, Fresno, and State Theater, San Diego. Other recent installations include the Newsview Theater, Los Angeles; Mayfair Theater, Ventura; Kelso Theater, Kelso, Wash.; Hawaii Theater, Los Angeles and Esquire and California theaters, Sacramento.

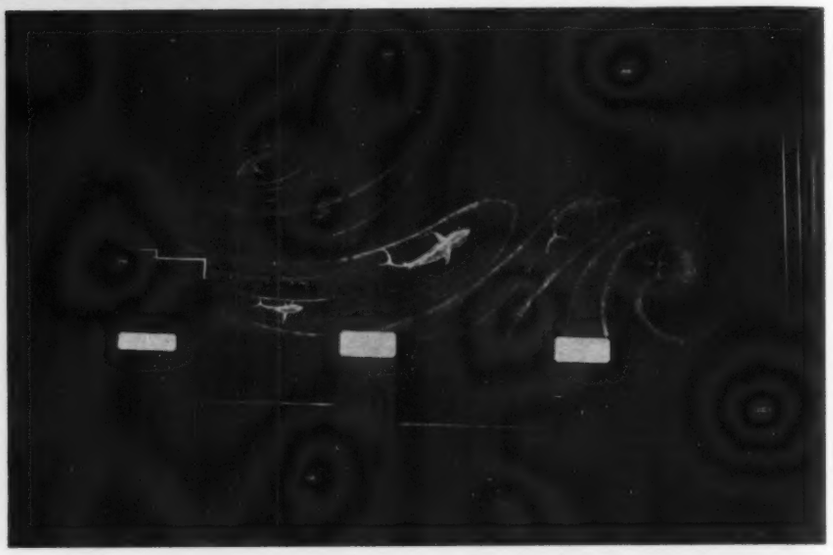
In the investigations that have accompanied these installations considerable experience has accumulated on sources of ultraviolet light. Tests have shown that the G-E 100-watt EH4 PAR-38 mercury reflector lamp produces ultraviolet light more simply and effectively than such lamps as the mercury 100-watt AH4, 100-watt BH4 with black bulb and 250-watt AH5. However, for many applications these other sources have individual advantages—lower cost in some instances, the self-contained filter of the BH4 and the higher output of the AH5 being examples—provided all are used in efficiently designed reflectors.

Because these light sources are of the mercury discharge type, each requires a ballast transformer. For proper lamp performance and to reduce line losses, it is also desirable to use power factor corrective apparatus. In fact power factor corrected apparatus plays such an

* *Better Theaters*, April 29, 1939.

Shown at the top of the page is the Fox West Coast Academy Theater in Los Angeles which features black lighted designs on ceiling and side walls. Lighting is from 24 100-watt G-E EH4 reflector mercury lamps in Keese Engineering Co. equipments. S. Charles Lee was architect; National Theater Supply Co., contractor

The Galston and Sutton Hawaii Theater in Hollywood, newest large showhouse, has an exotic Hawaiian atmospheric treatment with black lighted scenes on the sidewalls and stars on the ceiling. Ten 100-watt G-E EH4 reflector mercury lamps are concealed in a suspended central ceiling element. Equipments were supplied by Keese Engineering Co. and Phantom Lite Co.; Carl G. Moeller was architect and the B. F. Shearer Company the contractor



Black lighted side wall of the Lido Theater, Newport Beach, Calif. Ultra-violet sources consist of six 250-watt G-E AH5 mercury lamps in reflector equipments made by the Keese Engineering Co. Lido is owned by Si Silver; C. A. Balch was the architect and B. F. Shearer Company made this spectacular installation

important part in lamp performance that one equipment manufacturer refuses to supply any other type of equipment for theater installations.

Most common method of using fluorescent black lighting has been to cover surfaces or designs with the specially prepared fluorescent paints which are available. However, the number of special materials suited to theater decoration is increasing rapidly and now includes fluorescent carpets, wall paper, acoustical plaster and panels, plastic sheets, glassware and printed posters. As decorators gain more experience with these "canned light" materials, entirely new concepts of lighting and design will be available.

To secure the most satisfactory results from black lighting an understanding of the differences between fluorescent paints and ordinary coloring materials is essential. The following are important considerations:

1. The fluorescent lacquers are either transparent or opaque. Transparent lacquers especially must have an undercoat of ordinary reflecting material such as white paint in order to bring out their full effectiveness.

2. Colors must be selected with care, not only to produce the desired color design, but bearing in mind that the design becomes a source of illumination when subjected to ultraviolet light, the resultant colored lighting should be pleasing to complexions.

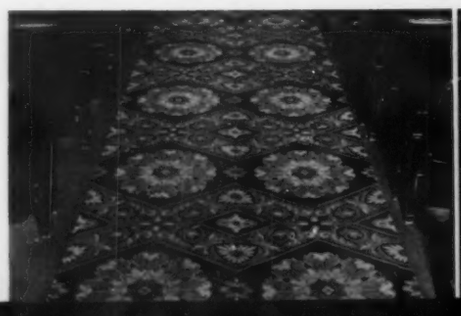
3. The efficiency of the overall system is largely determined by the number of square feet of actual treated surface exposed to each ultraviolet source. The more paint that is used, the more efficient the system becomes.

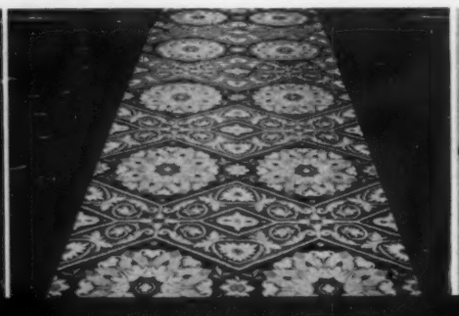
4. The invisible ultraviolet that is projected to the painted surfaces must be well controlled for efficiency and also to prevent spill from reaching the eyes. Although this spill is not harmful, it is objectionable, as it makes seeing more difficult because it causes materials in the eyes themselves to fluoresce and hence makes vision hazy.

The original conception of black light as an important factor in theater lighting has been largely overlooked in some of the theater installations. This conception was as follows:

With black light theater auditorium side walls, ceilings and screen surrounds could be made softly luminous without any glaring brightness contrasts, because the ultraviolet sources could be positioned so as to strike the surfaces from much more favorable angles than could visible incandescent sources. The use of elaborate decorative designs and traceries provides high brightness variations that violate this concept and direct attention from the screen to the walls and ceilings. Such decorative designs should be used primarily for intermissions rather than continuously during the showing of pictures. For the greatest economy and utility for theater auditoriums black light decorative designs will have to be supplanted by large surface expanses that have an overall fluorescent treatment which literally transforms walls or ceilings or both into luminous surfaces. Only then will black light play its rightful role in theater illumination.

Most recent fluorescent lighting adaptation is aisle carpet to assist patrons in finding seats. A sample of such carpet is shown in the picture at the left lighted by ordinary Mazda sources. The effect with ultraviolet is shown in the center view. At right is shown the special type "Conti-Glo" reflector designed to spread black light effectively over sections of carpet with no spill





Finger Print Eye Comfort

California Dept. of Criminal Identification installs fluorescent light in its file room

UPON the shoulders of the finger print expert rests a heavy responsibility. If he should make a mistake matching finger prints sent to him for identification from the mass of files, an innocent man might go to prison. Heads of the Department of Criminal Identification, State of California, realizing the important part lighting plays in the matching of finger prints, made available necessary money to relight the file room in Sacramento.

The file room is 31′-6″ wide and 176′ long with a 10′-6″ hard plaster ceiling. It was originally lighted with 200-watt enclosing glassware fixtures mounted in fifteen rows, three lights across. With this arrangement about 4½ to 5-ft. candles was obtained throughout the room in dark weather and somewhat better on sunny days.

Before determination of the type of lighting experiments were made with both incandescent and fluorescent lighting. It was found that fluorescent lighting was the correct means of illuminating this room. Samples of nearly all types of direct fluorescent lighting fixtures were placed in the room at various times. Experimenting with these samples revealed several interesting points.

It was found that the daylight lamp had a tendency to make finger prints appear to stand out from the paper, giving them much better definition than could be obtained with the white light. It was also noted that there was great contrast between the light and the reflector when using polished Alzak reflectors. Even with diffuse finished Alzak reflectors there was also a contrast which to a certain extent was glaring. With white porcelain enamel reflectors this contrast was greatly reduced, making for greater eye comfort. In each case when a new sample was brought into the room and lighted, interest was created among the finger print experts but they never seemed quite satisfied until one day an R.L.M. reflector was brought into the room and as soon as the light was turned on, they said, "That's it."

In laying out the lighting installation an average lighting intensity of 50-ft. candles was calculated for the room. This required 15 rows of fixtures, seven fixtures wide, mounted approximately 8′-4″ above the floor. Each row of fixtures was mounted on a piece of channel iron running the length of the row and supported from the ceiling at seven equidistant points. The seven reflectors were mounted by conduit supports end to end, making a continuous row approximately 30′ long.

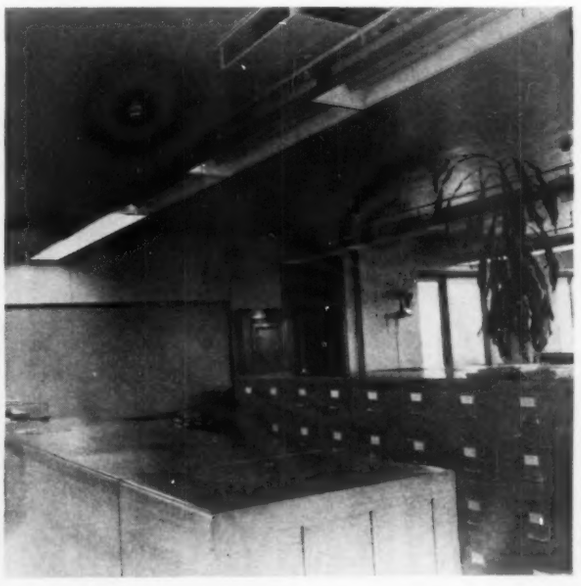
Fixtures were mounted from the original lighting outlets approximately 11′-8″ apart. Finger print files were relocated in the room in such a manner that each row of fixtures was in the center of the aisle between two rows of files, the files being placed back to back. In each case the row of files was 12′ long in the center of the room. Beyond the ends of the files, desks were placed. Here finger print experts, after finding the correct card, move to analyze the prints and make their report.

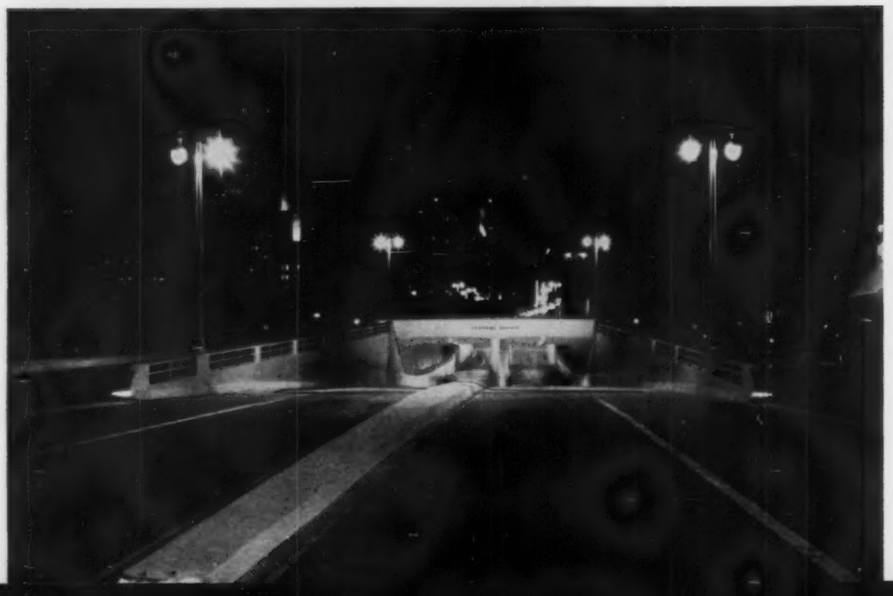
After they had been in operation for the necessary 100 hr. which allowed the tubes to work out their initial depreciation in light output, readings were taken throughout the room. At a height of 5′, the height of the top row of drawers in the files, 75 ft. candles was obtained; at the lowest drawer, 35 ft. candles. Directly under the units and approximately 5′ off the floor, a foot candle intensity of approximately 100 was noted.

Beyond the rows of files in the vicinity of the desks at a height of approximately 4′ from the floor and halfway between the rows of fixtures, a reading of 45 ft. candles was obtained which intensity carried through from that height to the floor without any appreciable change. At this height the rays of the two fixtures start to cross. Hence at points closer to the floor there was a more intense light from each fixture, yet at a greater distance from the fixture, because of the inverse square law, light intensity appeared to be maintained, a condition ideal for analyzing finger prints at the desks.

The experts of the Department of Criminal Identification tell us that previous to relighting the room they used to go home in the afternoon dead tired, their eyes red and burning. They could not seem to get into bed soon enough after dinner. Now they claim conditions are so good that they no longer feel tired and have plenty of time for other things besides sleep in the evening.

Below are shown the fifteen rows of fixtures required to light the 176 ft. long file room; to the right is a closeup of one of the rows of fixtures, seven of which were used to make a row





Lifesaving

SEVERAL hundred people attending a meeting, each equipped with his own flashlight would appear ridiculous, but after all, asks Ralph T. Dorsey, traffic safety engineer, City of Los Angeles, is it any more ridiculous than 10,000 vehicles using a highway at night, each one equipped with its own headlights glaring into the eyes of approaching drivers?

The rise of night time accident rates over daytime rates proves the individual light source outmoded, he concludes.

At present 75% of the traffic is found during daylight hours. It is now the practice, when such highways become overloaded, to build a new one. The initial highway is overloaded only 50% of the total day and night. Only 33% of its capacity is used. If more traffic could be handled safely at night it could often remove the need for a new highway and cost only a fraction of a new road for lighting.

It is good business, the public has found, to spend tax money for fire protection as a preventative measure instead of paying high insurance rates. The average householder pays $2.62 per capita for fire protection in Los Angeles, and only 50 cents per capita for traffic protection. Yet the cost of traffic tolls, injuries and property damage in one year was estimated at $1,400,000,000, an average of $46 for each registered automobile, $16 per capita.

If it is good business to invest in fire fighting equipment, why isn't it good business to make equivalent investments for traffic safety? Electrical World estimated the cost of excess night accidents per mile of highway at $3,000,

MAIN ARTERY—in Alameda is Santa Clara Ave. newly relighted with 4000-lumen lamps, 22-ft. to light center, 150-ft. spacing

HIGH SPEED INTERSECTION — Ramona Blvd. in Los Angeles where sodium luminaires both light and warn of danger

BLIND INTERSECTION—Ocean View and Vista Delmar, Los Angeles, where in 755 days prior to lighting three accidents killed one, injured eight; in 755 days after, no accidents. A G-E sodium luminaire warned of hazard

UNDERPASS—in Phoenix, made safer by light from 24 6,000-lumen units in pairs on 21½-ft. poles at approaches; 32 flush mounted Holophane units over center of traffic lanes spaced 22 ft. and lamped at 150 watts

with Light

more than the cost of safety lighting per mile by far.

In Los Angeles, said Dorsey, analysis of fatal traffic accidents was made in relation to its various types of streets, a total of 4,937 miles. It was found that 37.3% of the traffic fatalities occurred on 12 traffic streets with total mileage of 125 miles, only 2½% of the streets. Protection given to this 2½% of streets would affect 37% of actual hazards.

Of 197 killed on those 12 streets, 127 were pedestrians. Further investigation showed that on Figueroa, only moderately lighted, 19 pedestrians were killed after dark, only one during daylight. On the other hand, Wilshire, though not a model safetylighting job, has 1000-candle power lamps and better visibility than other Los Angeles business streets. Although it carries the heaviest traffic volume, it is down the list on traffic fatalities; a five mile section between Parkview St. and Beverly Hills city limit, had no fatalities during 1938.

Of the 25 first installations of sodium vapor at intersections a study was made for identical periods before and after installation. Before installation these 25 intersections had 81 accidents, 128 injuries, 12 fatalities. After installation there were 13 accidents, 15 injuries, no deaths.

From the millions allocated for highway improvement, none are budgeted yet for safety lighting of them. Modern standards call for sight distance of 1,000 ft. and mountains are torn down, ravines bridged or filled to get this sight distance — effective only in daylight. Relatively the cost of providing night sight distance is small and vastly important.

OVERPASS—on Pacific Coast highway, Santa Monica, acutely visible because of 10 Westinghouse Reflectolux incandescent, 5 sodium, 2 mercury vapor and 9 streethoods

HIGHWAY—Main Pacific highway, Tacoma, marked as such by sodium butterfly units at 25-ft. height, 25 ft. apart

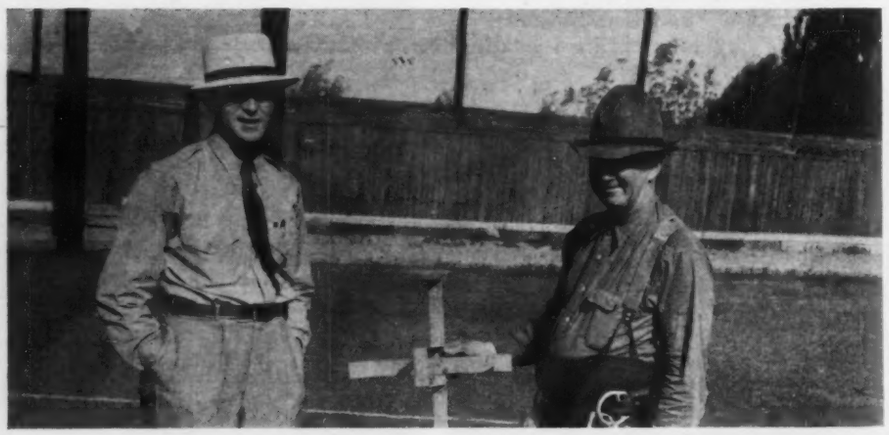
GROUNDS—about a public gathering place such as University of Washington athletic pavilion, Seattle, made safer by 12 500-watt multiple lamps on 22-ft. ornamental standards

STREET INTERSECTION—where three traveled streets cross, Mission Drive, Mission Road and Santa Anita St., San Gabriel, made safer by a G-E sodium luminaire

Five deep bowl units over each of nine courts give this Bevely Hills recreation center fine tennis court lighting. Not a big load, says Jack Hammond of Fresno, sports and playground lighting pays indirect dividends socially in reduction of juvenile delinquency and its attendant tax cost. Utility and community may well cooperate in this worthy enterprise

Sports — After Sunset

At Roseville high school playfield G-E designed a versatile job, 50 kw. for softball, an additional 100 kw. for hardball, and individual switching possible so that any type of game, pageant or show can be lighted from its 100 G-E Alzak aluminum floodlights, mounted on 12-ft. crossarms 75 ft. high on eight 80-ft. cedar poles, painted aluminum for appearance. Wiring is underground, using cable, and was installed by W. L. Harjes, contractor. Intensities are: 50 ft. candles at home, 35 pitcher's box, 20 second base, average of 10 in outfield



Adapting an idea described in ELECTRICAL WEST by C. J. Vacher of Ogden, Fred Steiner, Jr., plotted the distribution for the 120 G-E 1500-watt floodlights at Threkel's ballpark, Reno, and with a transit located at each beam center, had Mr. Threkel, former lineman whose hobby is baseball and who made the installation himself (at right above) line up the reflector so that he could see the red center dot through the hole in the frame. This Reno job has two 2-pole towers mounting 24 units, six single poles whose two crossarms mount 12 units; two transformers, switching at each pole; making a total of 200 kw.

BELOW—Even a casting pool can be floodlighted, as this at Santa Monica. Swimming pool such as South Pasadena's, too, are lighted

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CHALLENGE TO INDUSTRY'S PATRIOTISM

Calls for Plain Speaking

IT IS a pity that the greatest national defense effort in American history had to be made during a presidential election campaign. For a modern defense effort involves an intensely practical industrial project, while an election campaign involves an intensely emotional political propaganda. And those two don't mix.

That, as I see it, is the chief reason for the welter of claims and denials, charges and counter-charges that have been getting in the way of contracts for planes, tanks, guns and all the rest of the armament for which the American people are so nervously peering down the road.

We are told that the manager of industry, smarting and suspicious under the repeated attacks of government officials for years back, have been reluctant to assume the abnormal risks of defense contracts without commensurate safeguards, and that the politicians who must authorize those safeguards have been reluctant to do anything that might be construed as letting down the bars for unscrupulous business men to exploit the national emergency. For the one, the business risks of full speed ahead have been too great; for the other, the political risks of full speed ahead have been too great. So we don't go full speed ahead.

This is not written to increase that clamor of recrimination on either side. On the contrary, it is an appeal for some decent and thoughtful consideration on the part of all concerned—consideration for the urgent needs of the nation, for the problems and responsibilities of both the politicians and the industrialists, for the elementary principles of prudent business management, and for the good opinion of the man on the street. He is neither a politician nor an industrial executive. But his hide and his pocketbook are at stake in the national defense program—and he knows it. He has a right to the low-down on what is going on. And if he is left in ignorance or deliberately deceived, for the sake of either political or business whoopee, the payoff will be mighty poisonous political medicine for the politicians and equally poisonous business medicine for the business men who may be responsible.

* * *

The plain stark fact, to be faced squarely by us all, is that the national defense program is an emergency project—a desperately urgent emergency project.

As in every emergency that confronts a democracy, we are harassed by a confusion of counsel. As always, some of the confusion arises from honest but conflicting judgments, some of it from ignorance or muddy thinking. But, unhappily, much of it reflects the deliberate purpose of self-seekers to fish in troubled water—to capitalize the conjunction of a national emergency and a political campaign to boost their own interests. Already the charge that American business men are unpatriotic and interested only in profit has been put out as a smokescreen to cover up deficiencies for which business men are in no way responsible.

Now the man on the street finds it hard to see through this maze of excited contradiction. Not because he isn't smart—the average American can think straight enough *when he has the facts.* But in this case the facts are obscure and complicated—they have to do with matters that are strange to him. And to make it worse, at the height of his confusion, raucous voices constantly assail his ear with "simple" explanations of it all. But, as so often happens, most of these "simple" explanations make the matter a lot simpler than it really is.

* * *

Consider, for example, the cry that "industry refuses to get busy on national defense until its profits are guaranteed". Very clear and simple, to be sure; but also very false. The charge that American capital is "on strike" in the hour of national need. As silly as it is simple. The assertion that our manufacturers "won't even talk with a government anxious to place orders with them, without large financial concessions," and that "American corporate industry refuses to expand its resources for defense until it receives immunity from proper taxation." The resounding demand that we "conscript wealth as well as men"—whatever that may mean.

Particularly political has been the attack on the aircraft industry. It has been made to appear that aircraft manufacturers were instituting a sit-down strike because, in their greed for profits, they demanded more than 8%. Actually the 8% was not a net profit at all and the only concern of the manufacturers was to fight against incurring losses under the 8% limitation. And army and navy officers have sustained the aircraft manufacturers' viewpoint.

The air is full of explanations which, however simple they may sound, do not explain. And in most cases, I am convinced, the purpose of those who offer them is not to explain but to inflame. Those who try honestly to explain these issues from either side, find it impossible to do the job in such ringing phrases.

As I have said, our country has been caught short. As

a result, there are many reasons for the confusion and controversy. The plain fact is that we can produce our war equipment by only two means: (1) by converting the industries of peace into the industries of war, so far as that is possible; and (2) by building from scratch the new facilities we need to supplement them. In other words, we must create—with desperate haste—a new industry in America—an armament industry.

Right there is the crux of the problem that now confronts the industrialist sincerely trying to equip himself for his part in national defense. For this new armament industry is not the ordinary business risk against which he has learned to weigh the interests of his employees and his stockholders. It does not deal with familiar products and processes. It is not continuous—at least it has not been heretofore in this country—and it may fold up as suddenly as it has opened. It cannot hope to serve thousands of potential customers: it has but one sure customer—the United States Government—and wielding the sovereign power that customer can do just about as it pleases with respect to its needs and demands. Which means that not even this one is a *sure* customer.

* * *

No more unfair or deceptive charge ever has been leveled against American industry and American business man than the accusation of being unwilling to take the normal business risks of the defense program. The risks they are trying to minimize—they cannot possibly avoid them all—are very special and extraordinary risks indeed. So clearly is that true, that I doubt very much whether such questions and charges ever would have risen were it not for the fact we are engaged in a political campaign.

Already some of industry's great units have gone ahead with the building of new facilities, the purchase of special materials, and the actual production of armament in the face of all risks, gambling that their government eventually would work out some reasonable plan to protect them against excessive loss. Others, doubtless will follow suit.

But many other companies, for one reason or another, are not in position to do that. So before they begin to expand their facilities to handle defense contracts, they have asked their *only potential customer for those new facilities* to guarantee them—*not* excessive prices, *not* exorbitant profits, *not* immunity from taxation, as we are being told, but simply against the excessive losses that may result from very extraordinary conditions.

* * *

As this is written, it looks as though the legislation and the rulings necessary to accomplish this purpose soon will be forthcoming. Thoughtful and responsible officials of the government understand the situation and what is needed. But, unfortunately, their understanding and action will not quiet the professional business-baiters. So long as those gentlemen have their own interests to serve, so long as political excitement makes it easy to whip up public demand for a scapegoat to atone for disappointing progress with the defense program—just so long will the business-baiters find a receptive audience for their criticisms.

All of which suggests that business men must carry at this time a double responsibility, in addition to their obvious obligation to do the very best job they know how on their individual parts of the defense program.

The first of these added responsibilities is, of course, to avoid any possible basis for the charge that industry is exploiting the defense program in behalf of excessive profit, unfair treatment of labor or any other unworthy self-interest. The second is to see that the man in the street knows and understands all that I have tried to set down in the foregoing.

For the man in the street is deeply involved in all this. He is "in the street" only to the political orators. To the rest of us, he is the man in the factory, the man on the truck, and the man behind the orders that industry fills. In short, he makes up this living American industry on whom the politician's charges spatter. As an employee he has a stake in the solvency, the security, and the reputation of the very plants at which criticism may be directed. Knowing the facts, he can answer the critics so far as his own plant is concerned and can see how the same kinds of facts apply to all industry. If he is a customer, suffering inconvenience as a result of the plant's service to national defense, a knowledge of the facts behind the plant's problems will help to make him a defender rather than a critic of responsible business management. If he is a neighbor in the community, the facts will equip him to be an interpreter of industry's problems to the people of the home town.

* * *

In this national defense effort, business enters into a new partnership with government, but, more importantly, into a deeper partnership with the American people. It is more than ever essential that it take all of the American people into its confidence, beginning with the people in its plants and going out through the ranks of its customers and its community neighbors to show them that they have a common interest in seeing that the task of national defense is undertaken in the American way.

As we all know, there are in this country some people who would like nothing better than to see American industry fail in this supreme test of service to the nation. They will watch with jealous eyes every move or every company that is engaged on a defense job. They will disparage its achievements, exaggerate its shortcoming, and distort its motives. For they would like to make over American industry to their own pattern, and they'll never have a better chance to get started with it than has been opened up by the national emergency. Or so it looks to them.

So, great as are the business hazards of the defense program for the individual business man, even greater hazards are involved for American industry as a whole. But knowing the temper of American industrial leadership as I do, I am confident that it will handle its defense assignment with credit to itself and with great advantage to the nation that it serves—whether in war or in peace.

To help in that supreme test is the opportunity and the privilege of the McGraw-Hill organization.

James H. McGraw Jr.

President, McGraw-Hill Publishing Company, Inc.

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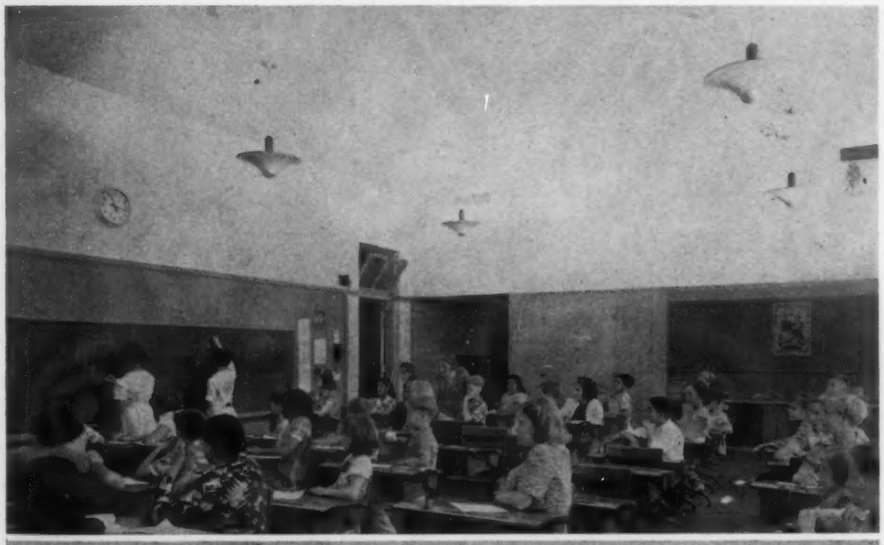
Harvard Business School

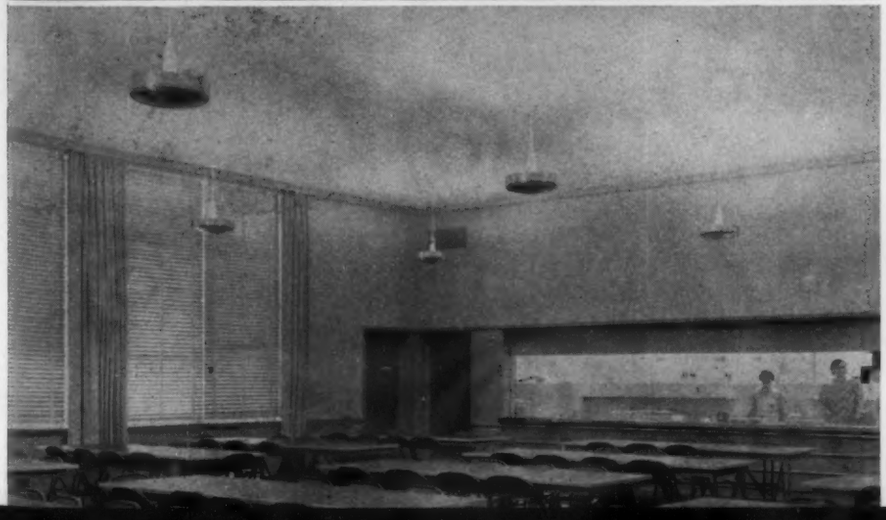
Schools Advance a Grade

PEA GREEN—not "little red", is this rural school (above), 22 miles northeast of Montrose, Colo., which Valley Engineering Co. equipped with 18 Curtis 300- and 500-watt luminaires in its four rooms, is modern now after waiting 25 years for electricity and light to come. Prior to electricity, on dark days class work often halted, other times classes moved near the windows. Now there is 18 to 25 ft. candles everywhere in the room. Wiring was installed for convenience outlets, too, so that radio and picture machines can bring modern educational accessories to this hitherto isolated school

PUEBLO—in the addition to its Junior College, has applied fine modern lighting. To left are seen its library and art room, typical of semi-indirect units used. In its gym, not shown, highbay lighting is employed; in halls and corridors fluorescent units are utilized

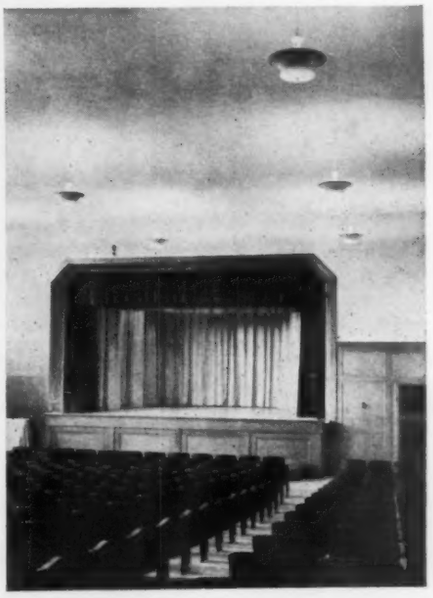
UPLAND—has a model of scientific school lighting in its new elementary school (below). Its 16 classrooms, library, cafeteria and auditorium have photo-electric control. Each classroom has six 500-watt units and two 200-watt units in the alcove at the rear, all indirect, lamped at full wattage on inside rows, 300-watts on outside rows. Control turns on light when intensity drops below 18 ft. candles. Pilot lights on switches warn teachers circuits are on so as not to leave without turning them off

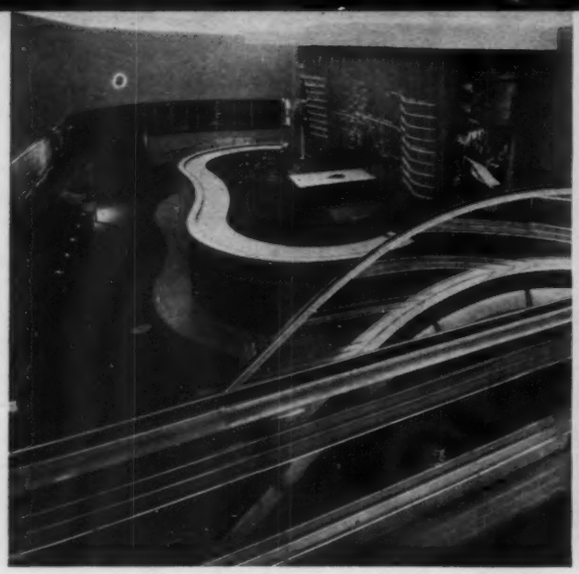


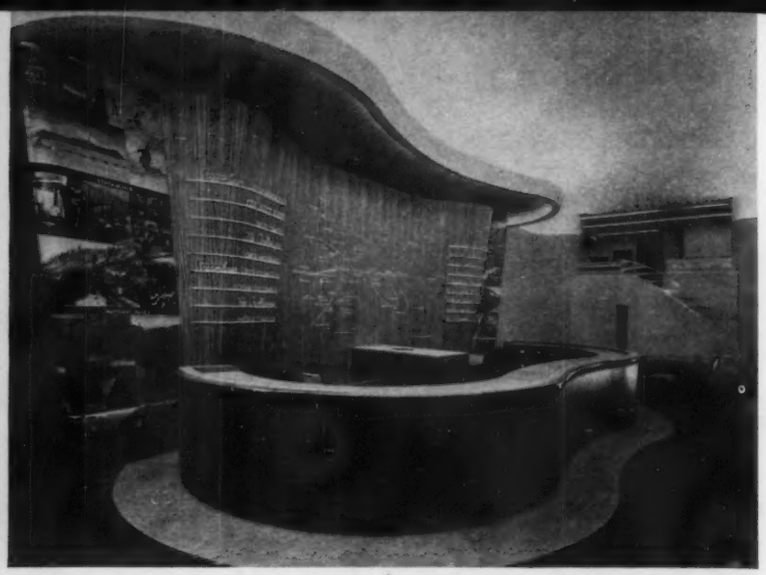


CAFETERIA, at Upland school (at bottom, left) uses 300-watt units. Library, not shown, has lighting similar to classrooms. Total connected load is 122,410 watts. Warren Smith, So. Cal. Edison, was illuminating engineer; Harry M. Gailey, electrical engineer; Colburn Electric Co. made the installation. Other electrical features include all-wave broadcast radio, intercommunicating public address, record reproduction and microphone pickup systems throughout

SPARKS—in Nevada, has a model school lighting system, engineered by Fred Steiner, Jr., of Sierra Pacific, installation by Pittsburgh Electric. Below is shown its auditorium, lighted by 300-watt semi-indirect units, its stage equipped with lighting control for stage productions or assemblies







Coves near the ceiling line conceal the reflector with its three rows of 48-in. 3500-deg. Kelvin white fluorescent Mazda lamps for general lighting. Zeon fluorescent is used under the curving canopy over the counter and under the Lucite rail to the mezzanine floor at the rear. Above, left, view from the front entrance; right, view down from the mezzanine. Lucite strips, illuminated by Zeon from the back, trace the railroad lines on the map

Streamlined Lighting for the Streamliners

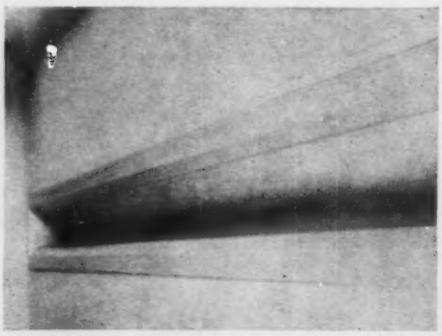
COMPLETELY fluorescent, with the exception only of window lighting, is the new downtown ticket office of Union Pacific on Union Square, San Francisco. And indirect too, is this fluorescent installation, distinguishing it from the many jobs in which the fluorescent tubes are bare or only partly shielded for direct illumination. Only in the stairways, washrooms and basement storerooms are the fluorescent lamps used exposed.

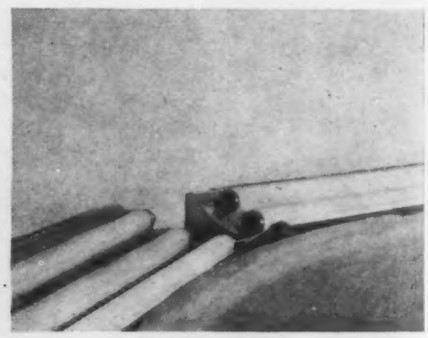
With a streamlined interior, designed by architects Albert Williams and Gerald Grimes, with lighting fixtures designed by Robert S. Prussia, and electrical engineering by Victor Lemoge, electrical contractor, new methods abound in this job. Electrical Products Corp. likewise provided novelties in display lighting.

Main service of 400 amp. is brought in at the basement and subdivided into 30 circuits for the main floor, 8 basement, 16 second floor; a feeder of four No. 2 to the roof for a large Zeon sign, another feeder to feed the belt cornice sign and exterior decorative lighting of Zeon just above the first floor, another the light-animated map at the rear of the country on the main floor.

Because the show windows are narrow and not enough intensity could be banked into them for adequate spectacular lighting of pictures and display cards, 1650 watts of incandescent lamps, 150-watt on 1-ft. centers, are used in Cole rippled mirrored and louvred lighting troughs. Windows, main floor nad roof and exterior signs are on time clocks controlling contractors.

The building is also air conditioned with provision made for refrigeration if later required. One special room in the basement is a small moving picture theatre in which to show travel movies to small groups. Lighting in this is from two open tube fluorescent fixtures.





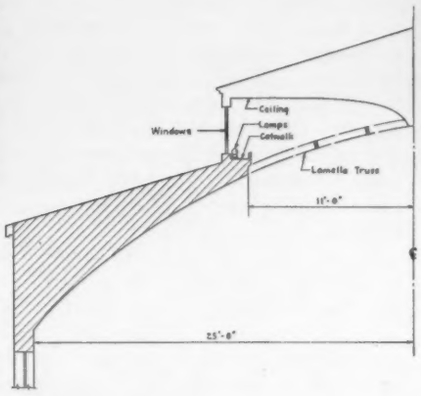
Above, left, the trough in the low ceiling of the mezzanine floor ceiling behind whose rolled edges on either side is concealed a 48-in. fluorescent lamp. At right, the arrangement of the bank of three fluorescent tubes in the main floor ceiling cove

Second floor offices are lighted by 960 watts of 48-in. fluorescent lamps, mounted in parallel in 9-ft. sections of a special fixture, shielded by Lamicord plastic sides. One strip fixture is 38 ft., the other 46 ft. long. Auxiliaries are mounted in the fixture. Venetian blinds at the windows were sprayed aluminum to better reflect light too. Average intensity is about 25 ft. candles with even distribution on each desk

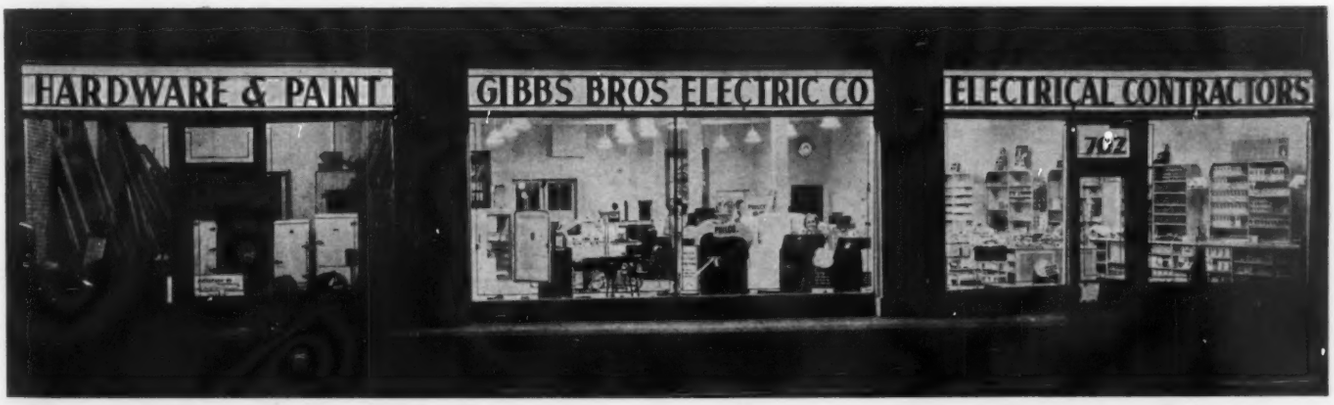
Lighting Results

OFTEN a simple idea produces a very effective result. The ideas on this page illustrate such simple yet effective methods and stimulate their application to other similar jobs.

General lighting from three Westinghouse indirect 750-watt units, 9 ft apart, special specular lighting from 8 Curtis flush mounted 200-watt ceiling units in two rows on 5-ft. centers, wall case lighting from five 36-in. daylight fluorescent units vertically mounted, distinguish Parsonage Jewelry Co., Pomona, as an exceptionally well illuminated store. Designed by Warren Smith, of Edison; Conner Electric Co. made the installation

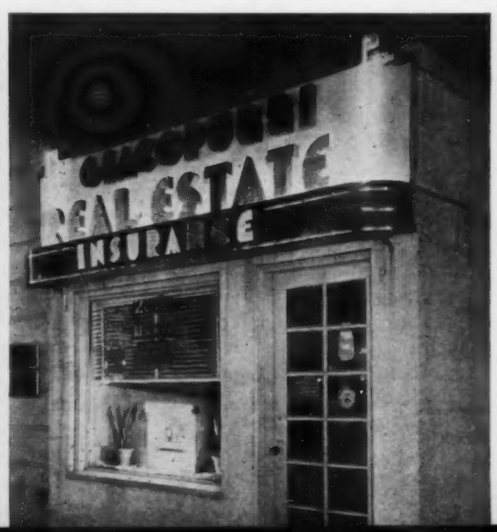


Exceptional lighting, yet so simply achieved, is found in All Souls Church at Alhambra, where Foster K. Sampson of So. Cal. Edison merely placed 75-watt lamps on 15-in. centers on the catwalk as shown in the sketch at left. Direct luminaires by Wagner-Woodruff Co., have 16-in. luminous area, with 200-watt lamps, for purely decorative lighting. Two 150-watt projectors in the ceiling spotlight altar. Sketch shows details



Cooperative relighting programs in old business districts going to seed revive trade and improve property values, Los Angeles Bureau of Power & Light finds. Above a modernized electrical dealer's store with luminous panel sign. Below a transformed real estate office

Samples of fluorescent fixtures sold by Bistline's Idaho Lumber & Hardware Co., Pocatello, solved the difficult problem of low ceilng illumination of the appliance department. Uptairs a single row of 12 48-in. white fluorescent tubes down each side are effective



Contractors Hear Of New Plan

BURBANK, California, is usually associated with the big airliners that are turned out in the factories there, or the productions of the Walt Disney studios that are created in this southern California town. To electrical men, there is another interest that turns their eyes and ears toward Burbank. Quietly enough, a new plan is being used there to sell real home wiring jobs. An attempt was made to get electrical contractors together for a better look and a longer hearing on this new idea, but to little avail.

One day one of the interested contractors talked it over with a friend wholesaler, dynamic Howard S. N. Stultz, owner and manager of Hollywood Wholesale Electric Co. Knowing the contractors so well, and feeling it would be a good thing, he took the initiative, and also the dinner check.

Individual initiative offered a solution to the wiring sales problem when Warren Penn (third from left) of Gold Seal Industries, told the contractor guests of Howard Stultz (third from right) how things were going in Burbank. Others at the head table were Arthur Kempston, Electrical Development League; A. H. Gudie, Biddle Trade Bureau; A. L. Stone, executive committeeman, NECA; F. L. Hockensmith, Electrical Development League; J. H. Newitt, L. A. chapter, NECA

He invited all his customers, some 125 Hollywood and Los Angeles contractors, to be his guests at a dinner to learn about this plan. Of that number 87 accepted and attended.

In opening the meeting Stultz told the group he had invited his friends so that they could learn the details of a copyrighted plan, used with exceptional success by Burbank contractors. He made it plain he wasn't to be considered as sponsoring or encouraging the plan, but just making it possible for his contractor friends to hear the story from the manager and originator of it, Warren Penn, of Gold Seal Building Industries.

A. L. Stone, executive committeeman of the National Electrical Contractors Assn., acted as chairman and introduced Penn. Other interested leaders of the adequate wiring movement were there too, F. L. Hockensmith, manager, and Arthur Kempston, wiring promotion field man for the Electrical Development League of Southern California, A. H. Gudie, Biddle Trade Bureau, J. J. Newitt, secretary, Los Angeles Chapter, NECA, and others.

Especially effective on interesting the speculative builders in good wiring, the plan as it works in Burbank was explained about as follows:

Under the Gold Seal Industries name advertising is directed to the prospective home builder, giving practical advice on financing, calling attention to various pitfalls and advising the employment of a reputable building contractor. The ads remind them to insist that the contractor use a Gold Seal Electrical Contractor. Such advertising is called to general contractors' attention by direct mail and personal salesmanship.

After a building permit is issued, a letter is sent to the owner, congratulating him on selection of a reputable building contractor, reminding him of the benefits of Gold Seal wiring, and suggesting it be included in the specifications. The "added value" is built up through a guarantee plan. Each job is issued a guarantee certificate, offering to make good all defects and workmanship for three years. Each electrical contractor is expected to make good his own job. However, in the event of failure to do it within 48 hours, the Gold Seal Industries does it, charging the cost to the contractor's share in a trust fund established by the payment into the fund of $2 per job by each contractor.

Since the contractor must make good he tends to use the better materials. In fact in the license agreement Penn requires the use of certain grades of material, requires that the electrical contractor "charge enough to pay his bills, a fair wage and make a profit." Although no prices are fixed, a suggested price list is issued for Gold Seal wiring, which further helps get away from the idea that jobs are "figured" rather than sold.

This advertising has built up a consumers' demand and the speculative builders soon started to put in Gold Seal wiring so as to show prospective buyers that he "put in nothing but the best." Billboards have been used by general contractors developing entire tracts which prominently mention the branded wiring. To help the idea along the program has placed display advertising with photographs on specific houses for sale by a builder and with small mention that the Gold Seal Wiring had been installed. Builders are "eating this up," and naturally the resistance to a fine wiring job is being torn down.

Label Service

Extension to manufacturers made by Underwriters Laboratories

Underwriters Label Service has finally been extended to twelve manufacturers making the heat resisting grade rubber covered small diameter wire, seventeen making performance grade, four making the latex grade and thirteen manufacturing the synthetic insulation, according to a bulletin from Underwriters Laboratories Inc. The heat resistance grade known as Type RHT is suitable for uses up to 167 deg. F. and is available in sizes from 14 to 8 in single and multiple conductor wires and cables. The other three grades known as Type RPT, performance; Type RU, latex; Type SN, synthetic; are each suitable for use up to 140 deg. F. maximum temperature and are available in sizes from No. 14 to 10 in single conductor wires only. Synthetic is available up to 4-0. All of these wires have insulation thicknesses of not less than 1/32 in. and are considered of the small diameter building wire type. Approval and listing by Underwriters Laboratories should release a large number of rewiring jobs previously held up pending Laboratories' approval.

Substation Built for Flexibility

CONSTRUCTION of the new Dry Creek substation by Public Service Company of Colorado has included safe and flexible arrangement and such features as: its being made up of individual transforming, regulating and switching parts, providing high salvage value; interchangeability with other stations; ease of inspection, and possibility of carrying out tests and maintenance without outages at an investment cost no greater than that for any other plan.

This new substation was located in a rapidly growing area to replace an overloaded 600-kva. 3-phase transformer, which had been supplying the district. The old substation consisted of a wood-pole crib carrying 13- and 4-kv. fuses and was not equipped with 4-kv. regulators or oil circuit breaker. The new substation has 1,500 kva. of transformer capacity with provisions for 13-kv. fuses if needed, and three 48-kva. single-phase regulators and an automatic reclosing oil circuit breaker on the 4-kv. side with 50,000 kva. interrupting capacity. Disconnecting and by-pass switches are provided for the regulators and oil circuit breakers.

A simple and inexpensive steel structure was designed to carry line dead ends, lightning arresters, 13-kv. line sec-

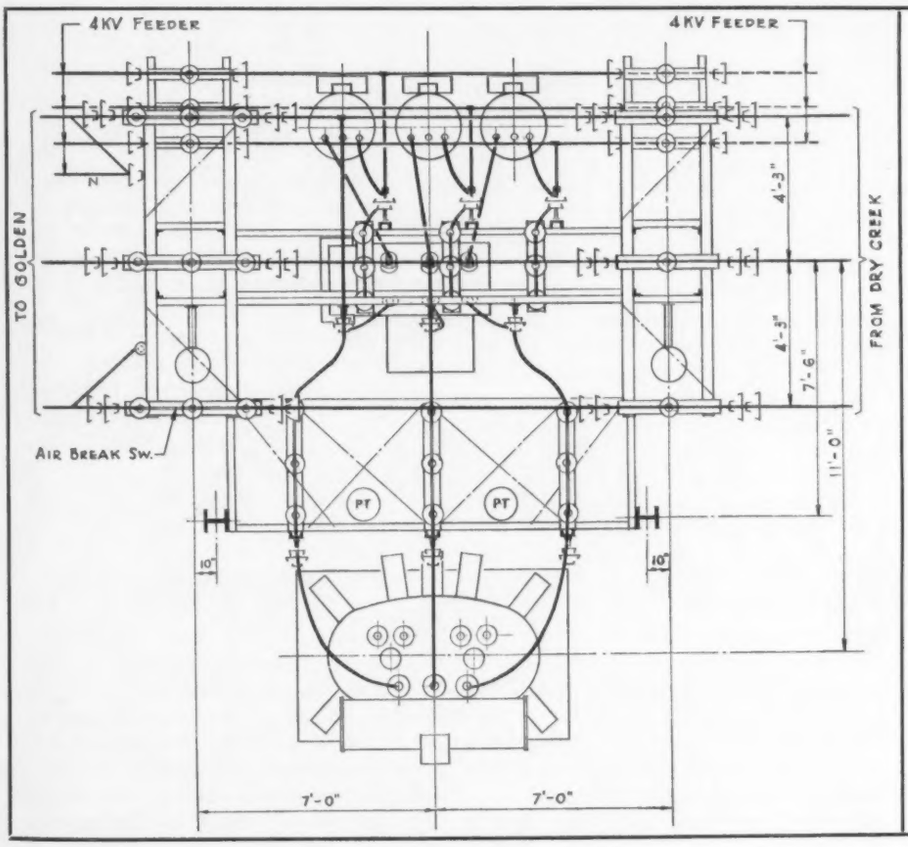
By Lawrence Robertson

tionalizing switches, 13-kv. transformer switch and 4-kv. switches. This frame, arresters and switches, together with foundations and fence, were common to any plan which might have been adopted. The 4-kv. by-pass and one set of disconnecting switches, together with standard distribution transformers and their liquid fuses for station power and lighting are not required by some arrangements. The station power includes sufficient capacity for ample lighting and operation of tools, filter press, etc.

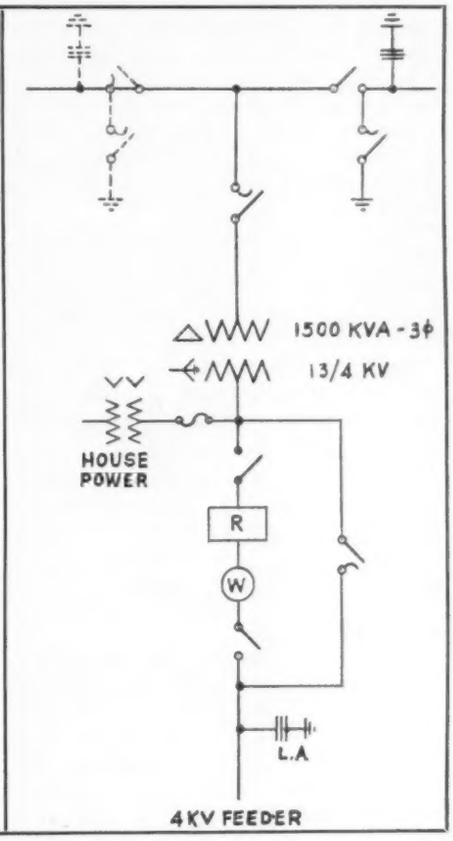
Experience with modern transformers has indicated that they are very reliable and require only casual inspection and failures are practically never experienced; however, it has been definitely demonstrated that regulators and circuit breakers, including their various relays, meters and auxiliary apparatus, do require inspection and maintenance. In this arrangement, this equipment can be by-passed and disconnected without outage to service.

The regulators are a standard size and of suitable capacity for this substation. They are also interchangeable with other substations and can be replaced quickly with a spare in case of failure. The oil circuit breaker also has sufficient interrupting capacity so that it could also be used at other locations. In fact, the entire substation can be moved with only the loss of foundations and labor of erection, and it was found that all other schemes included practically the same losses. It was thus demonstrated that a small substation could be built at a cost which did not exceed other schemes and would have a high salvage value and interchangeability of component parts, and also include flexibility of inspection, maintenance and testing and eliminate outages during these periods.

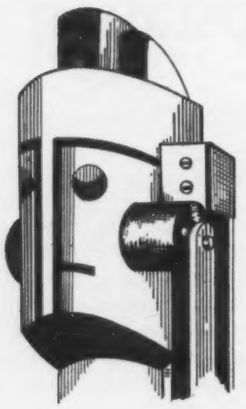
Plan of Dry Creek substation indicates the simplicity of layout



Single-line electrical diagram



ABC's of Relays



Part II—A discussion of relay types with their fields of application with a typical problem analyzed

By E. B. Kipp

CLOSELY related to the original induction-disc over-current relay are many others, all of which perform important functions in the protection of electrical transmission lines and apparatus.

Perhaps the nearest of kin to the over-current relay is the voltage relay. In construction, the two are practically identical except the voltage relay electromagnet is wound with a large number of turns of fine wire for operation on voltage instead of current. The relay may be either an under or over-voltage device and either circuit-opening or circuit closing depending upon the arrangement of the contacts. The circuit-closing over-voltage relay contacts are held open by the control spring until the system voltage rises and the increased electromagnetic torque overcomes the torque of the control spring.

The circuit-closing under-voltage relay operates in a similar manner except the control spring torque closes the contacts when the system voltage drops below a pre-determined point.

Time delay is obtained by adjusting the travel of the contacts and the braking effect of the permanent magnet exactly as with the over-current relay. The "pick-up" or minimum operating voltage is adjustable by changing the resistance of a small internally-mounted slide-wire resistor or by changing the position of the electromagnet pole pieces, depending upon the design of the relay.

As its name implies, the voltage relay is usually used to protect apparatus against voltage changes of predetermined value by closing the trip circuit of a breaker to disconnect the equipment from the line. It is particularly useful in protecting a. c. generators against over-voltage caused by sudden loss of load. Often, to insure continuity of service to an important customer, voltage relays are used to control the operation of change-over equipment which automatically switches the load to an emergency feeder during abnormal voltage conditions on the preferred circuit. When the preferred circuit voltage is again normal the relays transfer the load back to the preferred circuit.

Another direct descendant of the common watt-hour meter is the power relay. Mechanically, this relay is similar to the over-current relay but electrically it duplicates the watthour meter since it has both current and potential windings and the driving torque generated in the disc is a function of both the current and voltage (power) in the circuit. It also has the meter characteristics of reversing its direction of disc travel when the direction of power flow is reversed.

The power relay is essentially a contact-making wattmeter designed to close a pair of contacts when a predetermined amount of power flows in a predetermined direction. The magnitude of power necessary for operation can be varied within reasonable limits by changing the tap setting (effective turns) in the current coil circuit and by adjusting the torque of the control spring. The time setting is also adjustable as with the current and voltage relays. Many of the more in-

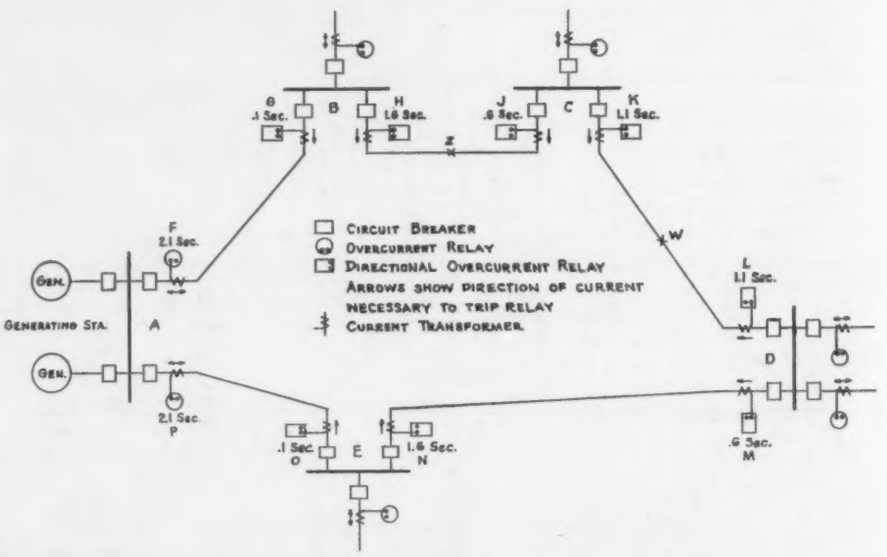


Fig. 1—Single line diagram of a simple loop transmission layout showing the application of directional over-current relays for isolating faults with a minimum of interference to other sections of the system

tricate protective relays are merely combinations of the simpler units which are sometimes modified to perform certain functions. The directional over-current relay is a good example since it combines the characteristics of the over-current and the power relay.

In this relay the over-current retains its operating characteristics but the power relay is used merely as a sensitive power-flow direction finder and not as a measuring element. In fact, the disc travel of the directional (power) element is limited to a small fraction of an inch to give practically instantaneous operation of the contacts.

In the original design, the contacts of the over-current and the directional elements were connected in series so that both had to close to complete the trip circuit. However, it was soon found that under some operating conditions, the over-current element would close its contacts and then, due to a sudden reversal of power flow, the directional contacts would flip closed before the over-current contacts had time to reset. To prevent incorrect operations of this sort most power-directional relays of present design are "directionally controlled." That is, the directional contacts are connected in the torque compensator circuit of the over-current element so that this element cannot even start to operate unless the direction of power flow is correct.

The directional over-current relay finds one of its most important applications in the protection of so-called "ring" or "loop" transmission systems. The loop system is simply a continuous transmission line running through a series of substations and terminating at its original source. Figure 1 shows a typical loop system connecting four substations with one generating station. Since each substation has the equivalent of two sources of of power a failure of any one section of the loop need not seriously affect the operation of the remainder of the system if the faulty section is disconnected promptly.

The function of the relays, therefore, is to locate the fault and trip out the substation breakers at each end of the faulty line section as quickly as possible.

Referring again to Figure 1, this simple loop system is protected with over-current and directional over-current relays as indicated. For a fault at W current will flow into the fault through substations C and D. Under this abnormal condition, all over-current elements on the loop would tend to close but since the power flow is in the reverse direction for relays G, J, M and O they cannot close their contacts. Relays F, H, K, L, M and P, however, can all operate and thus it is necessary to use the definite minimum time characteristics of the over-current elements to secure selective operation.

Assuming that the lowest dependable time setting of the over-current element is 0.1 sec., this setting is assigned to relay G. Then, proceeding clockwise around the loop the time settings of the incoming relays J, L and H at the substations are increased in steps of 0.5 seconds, giving the generating station relay P a setting of 2.1 seconds. Likewise, the setting of 0.1 second is assigned to relay J and (now going counter-clockwise around the loop) the time settings of the incoming relays M, K and H are progressively increased 0.5 seconds to a maximum of 2.1 for the generating station relay F.

The 0.5 second differential between relays is necessary to allow for slight inaccuracies in the relay settings and to allow time for the circuit breaker in the preceding substation to operate and interrupt the arc.

Returning to the condition of a fault at W, relays F, H, K, L, N and P will start to operate but due to the difference in time settings (F & P = 2.1 sec., H & N = 1.6 sec., K & L = 1.1 sec.) relays K and L will close their contacts first, trip out their associated breakers, disconnect the faulty section of line—exactly as desired. Conditions on the entire system will then return to near-normal values and all relays will reset to their zero positions.

Similar operations are obtained for faults on other parts of the system and the relay operation may be followed through in a similar manner.

Relays Save $ $ $

Protection of bus-sectionizing breaker saves additional investment in breaker capacity

By R. Rader*

WHEN circuit breakers are selected for use at a given location, provision is generally made for spare interrupting capacity to care for load growth and changes in system connections. In recent years the practice of providing spare tie lines between stations, as well as additional interconnecting transmission lines between different utilities, has greatly accelerated the increase in duty of a good many oil circuit breakers, and it is quite rare for an operating company not to be confronted with breaker replacement problems. Since this type of expenditure adds to the investment burden without producing a definite or determinable financial return, the replacements should be made only if the service and equipment cannot be safeguarded in a more economical way.

This principle was recently demonstrated at the Snoqualmie Falls generating station of the Puget Sound Power & Light Co. At this plant the maximum duties of eight 55-kv. oil circuit breakers had increased over a period of years to values greatly in excess of the breaker ratings, often demonstrated by oil throwing and minor explosions when the heavier faults were interrupted. According to the law of averages, a real close-up short was sure to develop sooner or later which would undoubtedly cause serious damage to both service and equipment. Engineers can't sleep under these conditions, and something had to be done about it.

Fig. 1 shows the arrangement of the breakers, which were connected to a ring bus, all sections of which were normally operated in parallel. With a short circuit on the bus, the total possible short circuit value, after allowing for current decrement to opening time of the breakers, was 453,000 kva. The

* Assistant engineer, Puget Sound Power & Light Co.

figures on the sketch show the paths of infeed to the short circuit, and the kva. per path. If a short circuit should occur on any one of the eight circuits near the bus on the line side of the breaker, the interrupting duty on the breaker would be the total bus short circuit, less the incoming power of the line in trouble. Thus, the maximum duty on the 150,000-kva. breaker was 393,000 kva., or 262 per cent of its rating. All the other seven breakers were in almost as serious a condition, and two other breakers in a nearby station were also over-dutied. The replacement costs were estimated as upwards of $75,000. This seemed too much to spend, so by means of a little scheming, a simple and inexpensive plan was developed which brought all the circuit breaker duties to a value within their ratings, the cost being so small as to seem almost negligible in comparison.

Fig. 2, shows the same ring bus, with the non-automatic sectionalizing switch replaced with an 8-cycle breaker of 500,000 kva. interrupting capacity, with its position shifted to point "B." Incidentally, this breaker was obtained by exchange from another station where its former duty had been much below its rating. The disconnecting switch at "A" is operated normally open. The oil circuit breaker at "B" is controlled by high speed type PHC double contact overcurrent relays in each of the eight breaker relay circuits, installed as additional to the normally required protection. The simplified circuit is shown for one line only, which illustrates the application. The starting current of each PHC relay is just below the value that its particular line breaker can safely interrupt. When this current flows, the PHC relay instantly locks out the standard line relays, indicated as CO relays in the diagram, which momentarily prevents the line circuit breaker from opening. The other PHC relay contact closes the trip circuit of No. 9 breaker at "B," which opens in eight cycles, shuts off about half the short circuit current, and then closes a "b" switch which again completes the line relay circuit through the auxiliary high speed MC relay, which permits the line breaker to safely clear the line in trouble.

By this method, the duty of each breaker was brought to a safe value at a sacrifice of only 8 cycles in total clearing time which, in this case, was unimportant since the line breakers are of relatively slow speed, and the clearing time still remains well within the limits of system stability.

An objection to the scheme was the fact that when the bus sectionalizing switch opens, the transmission network is separated at this point, which temporarily shifts the power supply to the load until the sectionalizing breaker can be reclosed. Actually, the lines chosen to remain in parallel with each other reduced this disadvantage to a minimum. Otherwise, it would have been necessary to provide automatic reclosing equipment for the bus breaker.

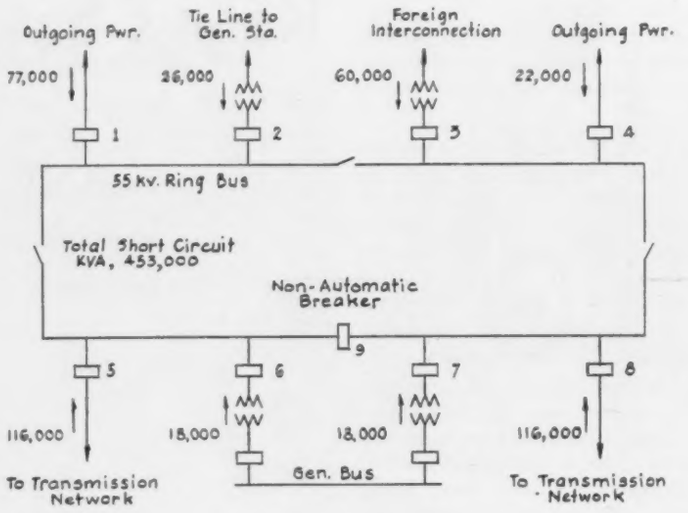


Fig. 1—Original line and bus arrangement, showing incoming kva. with a bus fault. Interrupting capacity rating of breakers 3 and 4, 150,000 kva. All others, 250,000 kva.

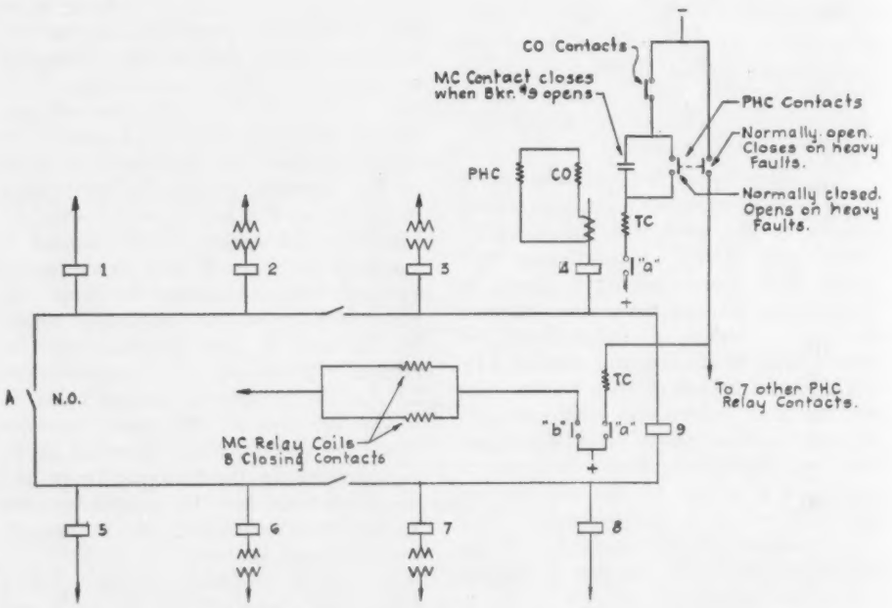


Fig. 2—Schematic diagram showing method of relaying bus sectionalizing circuit breaker to protect the line circuit breakers against over duty

It should be pointed out that all faults a few miles out from the station are cleared as formerly, since the bus breaker is not called upon to operate except on those more rare occasions when the short circuit is too severe for the line switch to interrupt successfully.

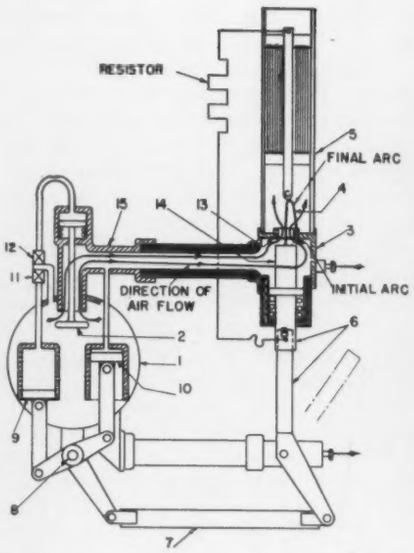


Fig. 1—Typical pole section of Allis unit

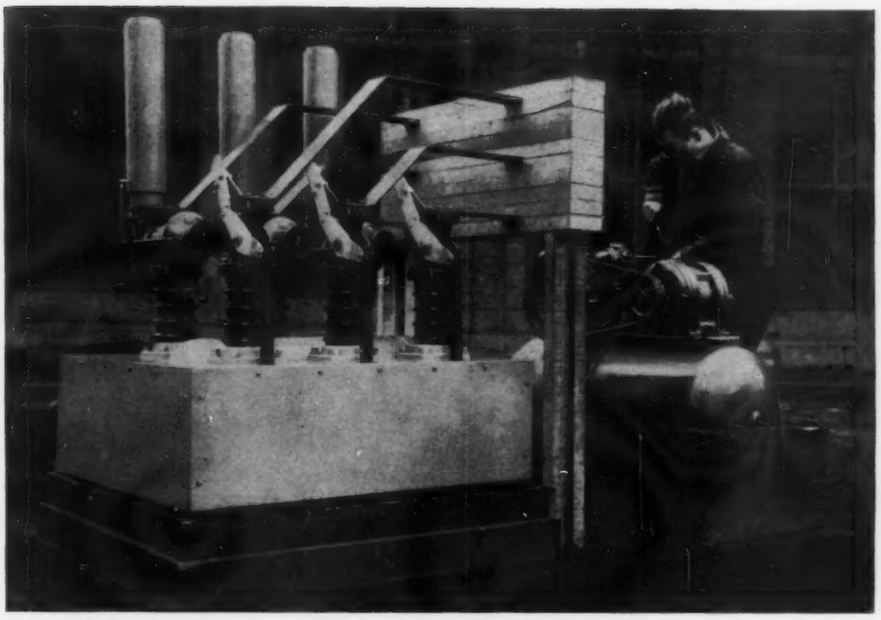


Fig. 2—This Allis-Chalmers axial air-blast unit is rated 1,200 amp., 15 kv. 500,000 kva.

Air-Break Equipments

In the following three short articles, major manufacturers outline developments in air circuit breakers. It is pointed out that performance, rather than absence of oil, may be the factor leading to their use.

Allis-Chalmers

By H. W. MARTIN and K. B. SEELY
Allis-Chalmers Mfg. Co.

Studies of circuit interruption phenomena in power systems, indicate the desirability of circuit breakers designed to prevent successive restrikings during the interrupting process (these tend to produce overvoltages of progressively increasing amplitudes) and to prevent the high overvoltages which usually follow complete interruption.

Description

In the design of the Allis-Chalmers axial air-blast circuit-breaker, means are provided not only to promote such rapid dielectric recovery as to eliminate restrikes, but also to reduce the rate of rise and magnitude of the recovery voltage.

The interrupting chamber has a hollow stationary contact 13, forming a port or entrance to the muffler. The movable contact 14, in making contact with the stationary contact, closes the port and is normally held in this position by heavy springs.

Operation

The interrupting process is initiated by admitting compressed air to the arcing chamber 3, through the air-blast valve 2. The compressed air, operating against a piston attached to the movable contact, causes the contacts to separate; thereby providing an outlet through which the compressed air escapes into the interrupting chamber and thence to the muffler.

As the contacts separate, an arc is drawn, which is immediately enveloped and blown into the interrupting chamber. Extension and centralization of the arc follows with extreme rapidity, and the dynamic, dielectric, and cooling characteristics of the compressed air result in extinction of the arc at the first current zero.

Where high rates of recovery voltage are anticipated, rate of rise and magnitude of the recovery voltage is limited by means of a resistor, which is automatically inserted into the circuit by the action of the arc itself.

Simultaneously with the admission of air to the arcing chambers, a small port permits operation of piston 10 at a predetermined rate, resulting in the opening of the isolating contacts 6, immediately after arc interruption under no-load conditions. As soon as the isolating contacts are completely open, the main air valve closes and the arcing contacts reclose.

When closing, it is necessary only to close the isolating contacts by actuation of control valve 11, as the arcing contacts are already held closed. Due to the high closing speed obtained by the use of compressed air, contact burning on closing is very slight even when closing against heavy currents (over 140,000 amp. have been closed on test without appreciable burning).

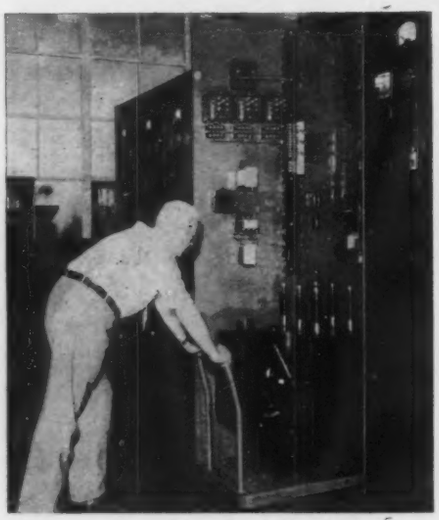
Basis of Design

Dielectric Recovery—An analysis of the action of the compressed air reveals that there are three characteristics influencing dielectric recovery. First, the dynamic effect of the air pressure extends and centralizes the arc and blows the arc products into the cooling chamber. Second, the rapid expansion of the air as it passes into the interrupting chamber is accompanied by intense cooling which tends to de-ionize the arc and limit its conducting ability, particularly as the current approaches zero. Third, the dielectric strength of the compressed air is so high (at 135 lb. pressure approximately equal to oil) as to permit a comparatively short contact separation to be used in order to prevent restriking of the arc at that short break distance which produces maximum air-blast and interrupting efficiency combined with low air consumption.

Control of Recovery Voltage—The rate of rise of the recovery voltage immediately following the first current zero depends upon the characteristics of the circuit and also upon the instantaneous value of the generator e.m.f. at current zero.

Immediately following the first passage of the current through zero, the stored energy of the system tends to

Fig. 1—G-E's Magne-Blast breaker, rated 100,000 kva., 1,200 amp., for application in vertical-lift, metal-clad switchgear on circuits of 2,300 to 5,000 volts



discharge, resulting in a high-frequency transient's being superimposed upon the normal frequency, which, unless means are introduced to control it, may rise to a value two or more times the instantaneous value of the generator e.m.f.

In the axial air-blast circuit breaker, resistors may be employed where necessary to dampen high-frequency transients and improve power factor. While the use of the resistor affords a measure of control of circuit interruption phenomena, it should be pointed out that the efficiency of application of the compressed air is so great that maximum half-cycle arcing times are consistently obtainable without resistors. Indeed, while resistors are utilized in the large interrupting capacity breakers, they are not regarded as essential in the smaller sizes.

Conclusion

While the main objective of oil elimination has been largely responsible for the development of the axial air-blast circuit breaker, the promise it gives of improved system operating conditions may well outweigh all other considerations regarding its adoption.

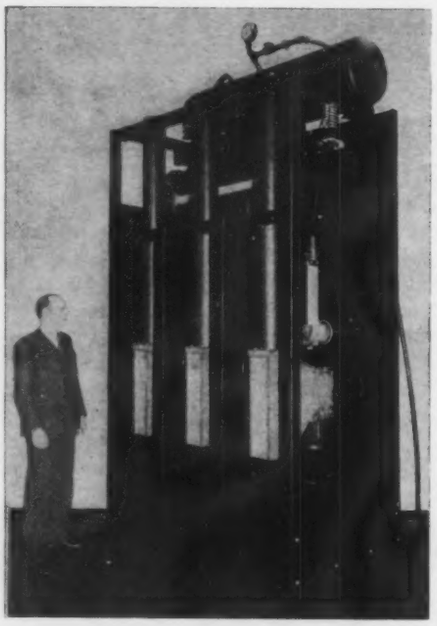
General Electric

By L. S. HOBSON
General Electric Co.

Modern high-voltage air-circuit breakers are enjoying greatly increased demand because they offer the advantages of cleanliness, accessibility, low maintenance, and absence of oil, in addition to the best inherent characteristics of oil circuit breakers. Comparable in size and configuration to oil circuit breakers, they are available for application from 2,300 to 15,000 volts and from 100,000 to 2,500,000 kva. Because vertical-lift metal-clad types constitute the major share of steel enclosed equipments, the application of air breakers to this type equipment (Fig. 1) has proven an important factor.

G-E finds the greatest demand is for the medium-capacity 100,000-kva. Magne-Blast breaker in vertical lift metal-clad switchgear applicable to 2,300- and 5,000-volt distribution service, powerhouse auxiliaries, and industrial installations. This breaker uses a mechanism, bushing design, and configuriation conventional on modern oil breakers. The interrupting element is an interleaving arc chute in which the arc is lengthened and squeezed, dissipating its heat, and reducing the energy released during interruption. The method by which this is done is new in the circuit-breaker art and produces exceptionally good results.

Fig. 2—G-E air blast unit for central station duty, rated 1,500,000 kva., 15 kv., with 23,000-volt insulation



Interrupting devices of any type must at some opportune time insert resistance (or insulation) in the arc path which will prevent the arc from continuing. The insertion of resistance ordinarily takes place at current zero in a.c. interruptions, and the speed with which the resistance is inserted must have a definite relation to the speed at which the potential across the interrupting element builds up, after a current zero, in order to have a successful interruption.

Arc Squeezing

Most interrupting devices in the past had to take the full value of the short-circuit current or nearly so, and have been forced to interrupt under high rates of rise of recovery voltage. They have absorbed the full shock of the interruption. The Magne-Blast breaker, on the other hand, lengthens and squeezes the arc, increasing the resistance of the arc so that the constants of the circuit are actually changed, the value of the short circuit current radically reduced, and the power factor raised to such an extent that the recovery voltage has a low rate of rise.

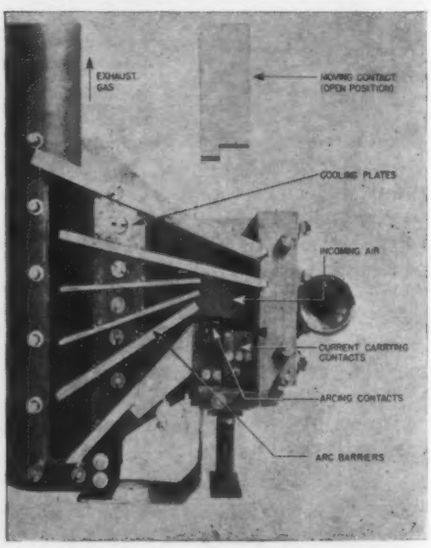
In the Magne-Blast arc chutes, arcing time is a "short" half-cycle. During that half-cycle the current has been cut down (peak value) and the current zero has been pulled forward, improving the power factor of the circuit with the result that the recovery voltage starts off on nearly a sine wave. Oscillograph records show the recovery voltage rate to be 15 volts per micro-second, a reduction of over 97% from the value which would have been recorded if an oil breaker or some other types of interruptors had been used.

Station Units

A considerable number of higher-interrupting-rating, station-type breakers of the air-blast type have also been ordered and a number of these are in service. This type of breaker (Fig. 2) operates entirely on compressed air. A piston actuated by compressed air sets the contacts in motion and a blast of air directed into a new type of arc chute extinguishes the arc.

This arc chute, shown in Fig. 3, operates on a very simple principle. A blast of air is directed at the arc drawn between the contacts and is blown into a chute having a number of transverse barriers. At current zero the arc momentarily dies and the compressed air forces the hot gas and conducting par-

Fig. 3—Arc chute for G-E breaker, showing stationary and moving contacts between which the arc is drawn, air enters at 90° to arc



ticles farther into the arc chute between the barriers. As the recovery voltage attempts to come back over its old path it finds that a number of insulating barriers have been inserted to prevent the re-establishment of the arc, and the circuit is interrupted. The compressed air pushes the hot gas toward the opposite end of the arc chute, past cooling plates which dissipate the heat and guide the remaining gases on out the exhaust tube.

This type of interrupting element, in addition to having simplicity, keeps the hot gas products of the arc entirely encased until they are expelled through the exhaust tube out of the interrupting compartment. This makes it possible to maintain high values of insulation strength required by central station service.

This type of breaker in high interrupting capacities is available in self-contained cubicles which are complete with bus, disconnecting switches, and the required auxiliaries for the compressed air breaker.

Westinghouse

The type CA compressed-air circuit breaker has been developed especially to meet the requirements of those operators who prefer breakers using air as an interrupting medium. This particular type of breaker is available for 15,000-volt service and for kva. interrupting capacities as high as 2½ million.

The compressed-air breaker itself interrupts an arc on the cross-blast principle, that is the arc is drawn between contacts which open in a line perpendicular to insulating splitter plates. The compressed-air stream is blown at right angles to the arc and quickly elongates it between these plates. The arc is reduced in cross section and by the time a current zero is reached, very intense diffusive effects are produced which rapidly de-ionize the arc space and effect the interruption.

The design is shown in Fig. 1. The device consists essentially of a compressed air storage tank at the bottom, an air operating mechanism to one side of this tank, suitable connecting levers for separating the contacts and drawing the arc horizontally, an air duct between the tank and the vertically situated arc chamber, and a separate mechanically-operated blast valve for each phase.

This type of construction naturally places all parts of the breaker which operate at grounded potential in the bottom of the cells or cubicles in which such breakers may be mounted. Just above the tank and mechanism a horizontal baffle plate is introduced to isolate the grounded portion from the current-carrying parts.

The breaker section of a metal-clad unit is illustrated in Fig. 2.

Operation of a breaker of this type by an air mechanism has a number of important advantages. The mechanism consists of an air cylinder in which a piston moves vertically. This piston is connected by necessary cranks and levers through insulating pull rods to each of the three movable contacts. It is unnecessary to interpose any trip-free mechanism, since entirely equivalent results can be obtained with proper control of the air-operating mechanism itself.

Construction of the arc chamber is such that the arc is drawn in a "throat" formed by the side walls of fibre and the slots in the ends of the fibre splitter plates. The air stream is directed nearly perpendicular to the arc and directly into this throat. The splitter plates nearest to the stationary contact receive most of the blast under non-arcing conditions. When the arc current is instantaneously high, however, pressure in the throat formed by the generation of gas from the fibre splitters diverts a portion of the air stream toward the splitters farthest from the fixed contact, and the superfluous ionized gases are carried away. This action is enhanced by widening the side walls of the throat rapidly on the contact side of the end of the splitter. The effect of this construction is to divert the part of the air stream sideway when the arc current is high. If the ionized "flame" from the arc is thus carried away as formed, conditions are more favorable at current zero for de-ionization, and noise and external demonstrations are reduced.

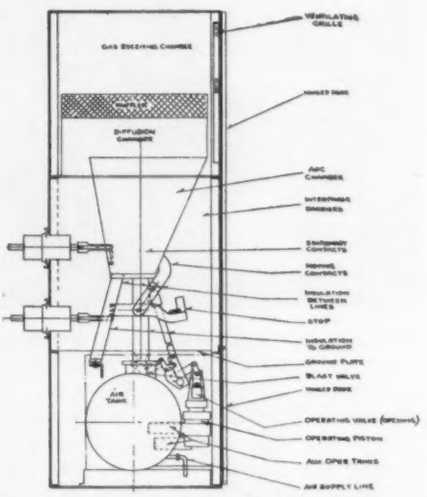


Fig. 1—Cross-section of 1,500,000-kva. Westinghouse compressed-air unit, type CA

A muffler placed at the end of the chute serves to eliminate residual flame and reduce noise. It consists of a mixing chamber, followed by a series of perforated metal plates which suppress flame.

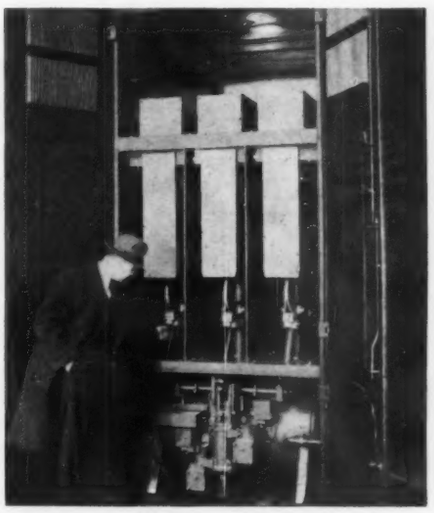


Fig. 2—Same Westinghouse unit as in Fig. 1, 1,500,000 kva., mounted in metal cell

The supply of compressed air for breakers of this type is, of course, a very important consideration. If a large number of breakers are installed, two independent systems are used for air supply. Each consists of a compressor unit, two storage tanks, cooling coils for the condensation of water vapor contained in the air, and necessary auxiliaries. It is expedient to store the air at 250 lb. pressure and to use a reducing valve to drop this pressure to 150 lb. in the air line and breaker tanks, in order to save space.

Safety features in the air supply system consist of cut-off valves which automatically prevent air from discharging either from the system to a faulty breaker, or from the breaker tanks to a leaky system, and alarm valves which signify leakage in either breakers or supply system.

A compressed air breaker of the type described is unusually rugged, demands little maintenance and requires small installation space. A 1,500,000-kva., 15-kv. breaker requires only 68-in. width, 46-in. depth and 120-in. height. The device does not constitute a fire hazard, since it is free of readily inflammable material. The interrupting time is unusually short. Mechanically the breaker is simple and reliable. An entirely new concept of indoor circuit breaker application is possible, based on the use of a compressed air device.

AIEE Urged to Extend Field

President asks engineers to look beyond strict limits of technical work. Joint meeting with IRE stresses frequency-modulated radio

"TODAY'S crying need is for more engineering method in our daily lives and in our government."

That was the essence of the message given by Dr. R. W. Sorensen to elec-

Sixtus, Pacific Electric Mfg.; Jolliffe, Bonneville, and Schwager, also of Pacific Electric

trical men who gathered in the Ambassador Hotel, Los Angeles, Aug. 27-30, for the Pacific Coast convention of the American Institute of Electrical Engineers.

Dr. Sorensen's plea for an enlarged conception of engineering activity was set forth in his opening address as national president of the Institute. Dr. Sorensen is with the faculty of California Institute of Technology and was introduced to the meeting by N. B. Hinson, chief engineer of Southern California Edison Co., who was convention chairman.

"It is time for us to ask ourselves," he said, "whether—in building a power house—we are justified in confining our task simply to seeing that the work itself is well done."

Pointing out that—by establishing a higher standard of living—the engineer set up a front-line of defense when he developed the cotton gin, Dr. Sorensen emphasized the necessity for carrying forward this same type of pioneering. But, he added, there is no guarantee in the world today that a technical development will in itself contribute to better living. Today the engineer must analyze his work not only in terms of its mechanical value, but also in terms of its social significance.

Dr. Sorensen suggested a three-way effort to members of the AIEE: First, do your own job well; second, see that government interference and experimentation are stopped; third, enlarge your activities beyond the strict field of electrical engineering.

Alluding to preparations for national defense, Dr. Sorensen emphasized the work which must be done to prepare the nation for meeting armed invasion with armed defense, indicating the readiness of engineers to help.

Next speaker at the opening session which preceded the series of technical meetings was Douglas Shearer, sound director of Metro-Goldwyn-Mayer studios, who told about some of the electrical aspects of motion picture production. To indicate the dimensions of the movies' electrical problems, Shearer described one MGM set, which required

Gardett, Los Angeles Bureau, and Warren, Westinghouse

40,000 amp. of 120 volts d.c. for lighting alone. This was equivalent to a temperature rise of 10° F. per min. on the set. Hence, to keep the stars from toasting, it was necessary to superimpose loads for 150 tons of refrigeration and for air circulation of 9,000 cu.ft. per min.

MGM, he said, purchased about 12 million kw.-hr. per year.

Protective Devices

Among papers at this session was one describing an improved a.c. pilot-wire relay by J. H. Neher, Philadelphia Electric, and A. J. McConnell, General Electric (AIEE paper 40-127). Their system is one of the opposed-voltage type in which substantially no current flows in the pilot wires under normal, or through-fault conditions, and is for the purpose of giving full protection for any type of fault, operating over a single telephone pair and without need for a potential supply.

Extension of uses of a carrier channel was discussed by R. M. Smith and S. L. Goldsborough of Westinghouse (AIEE paper 40-129). Point of their paper was that multiple use of a channel will often justify the installation of carrier equipment in cases where a single use might not. Often the operations can be carried on non-concurrently, thus keeping investment to a minimum. Their paper was a clarification of problems involved in combining such functions as: telemetering, supervisory control, load control, communication, remote tripping.

Transmission and Distribution

Bradley Cozzens, Los Angeles Bureau of Power & Light, presided. V. G. Rettig, Cincinnati G&E, described a simplified method for calculating effects of additions to power systems, based on the assumption that all load currents on a system remain fixed in magnitude and in phase angle with respect to the voltage at one point on the system (AIEE paper 40-133). He set forth the limits of accuracy of the method, its field of application, which is "when the line change or addition makes up

Mackeown, Cal Tech, and Hunt, So. Cal. Edison

only a small part of the tie capacity between generating plants."

R. W. Butler, G-E, presented a paper on capacitors (AIEE paper 40-126) endeavoring to sum up and classify the

ways in which applications of capacitors affect the fundamental characteristics to which they are applied. Particular contribution of this paper is its discussion of results to be expected from adding capacitors in combination with various other equipment, and of

Laughlin and Cozzens, both of Los Angeles Bureau

adding series capacitors to lines already carrying shunt capacitors.

A group of Westinghouse engineers presented a paper (AIEE paper 40-107) on shielding transmission lines. Their studies show that natural lighting is most closely simulated in the laboratory by making a point electrode positive with respect to a plane upon which is located the model transmission line. They emphasized that deflection of ground wires and conductors under wind may significantly affect protection angle.

G. Leslie Hill, of PG & E, described a new type of power fuse, based on seven years of field experience (AIEE paper 40-134). It uses two fuse elements of different rating, in series. On overcurrent, the lower-rated element melts first, drawing an arc. Energy from this arc is used to build up a pressure and force a sealing plug, establishing a second arc. Pressure in the tube then blasts an arc-extinguishing substance into the second arc and interrupts the circuit.

Instruments, Machinery, Etc.

Frank I. Morgan, of Pennsylvania Water & Power, reported experience with an electrical governor (AIEE paper 40-132), including application to a 13,500-hp. double-runner turbine, wherein the electrical unit provided superior speed regulation to that obtained with fly balls. He visualizes application to obsolete pressure-operated governors without the expense entailed in complete replacement.

In his paper "Transient Analysis of Completely Transposed Multi-Conductor Transmission Lines," Louis A. Pipes, of Harvard, presented the mathematical development of an equation giving the various traveling waves of current produced by the application of variable electromotive forces to a group of lines. (AIEE paper 40-108).

Joint Meeting

On Thursday morning, AIEE members met jointly with the Institute of Radio Engineers to hear a series of discussions on frequency-modulated radio. F. E. Terman, of Stanford, presided. A full delegation turned out to hear Major E. H. Armstrong, of Columbia University, who has pioneered the development of frequency-modulated equipment for commercial broadcasting.

He outlined the experimental background and development of the art to the point where standard FM receivers may now be purchased from such manufacturers as Stromberg-Carlson, General Electric and Zenith.

As a commercial possibility, Major Armstrong sees the opportunity for in-

Kresser and L'Hommedieu, both of Westinghouse

dividuals, operating on a small scale ($15,000 to build a small-power FM broadcasting station), to form new nation-wide broadcasting chains. A group of frequency-modulated stations, networked by radio relay, are scheduled to start broadcasts through New England soon. Discussion indicated that some Western power companies are considering this type of equipment for use on their own emergency field-communication systems.

A paper by I. F. Kinnard and J. H. Goss, of General Electric (AIEE paper 40-128) investigated braking magnets for watt-hour meters. The paper dealt particularly with setting up test procedures for determining characteristics of permanent magnets. Looking into the field of newer magnetic materials, the authors found Alnico II especially ideal for meter purposes.

J. B. Hodtum, of Allis-Chalmers, reporting on power factor testing of transformer insulation (AIEE paper 40-130), found the method generally satisfactory, but pointed out that available data do not permit conclusions about the extent of resistance decrease, without capacitance increase, that may take place before insulation becomes unsafe by reason of moisture aspects.

Behavior of point gaps at 60 cycles (AIEE paper 40-131) by Jean V. Lebacqz, of the University of California, was a report of investigations to determine whether certain types of electrodes would give consistent results. He found that at spacings up to 30 in., voltage increased linearly with absolute humidity, that the relation with atmospheric pressure is complicated, that as gaps increase to 18 in. or more, type of electrode has little apparent effect.

B. P. Baker, of Westinghouse, described a field test (AIEE paper 40-114) of an oil-poor circuit breaker on Southern California Edison's system, which indicate possibility of the vertical-flow interruptor proving useful at 132 kv. and upward.

Non Technical

In addition to the main business of the meeting, delegates found time to participate in sporting events and inspection trips arranged by the committees. Electrical points of interest included the KNX transmitting station, Columbia Steel mill, the Los Angeles Bureau of P & L's receiving station E.

Facilities of the Ambassador Hotel were drawn upon for the president's reception, and a dinner dance in the Cocoanut Grove, while the Riviera Country Club was the scene of the convention banquet.

Among those assisting Chairman Hin-

Blakeslee, Los Angeles Bureau, and Skilling, Stanford

son were: M. A. Sawyer, assistant to chairman; H. L. Caldwell, vice-chairman; J. M. Gaylord, secretary; F. C. Lindvall, treasurer; J. H. Vivian, heading the technical program committee; H. S. Warren, entertainment; O. A. Gustafson, sports; F. W. Maxstadt, student activities.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 29

SUBJECT.....DRYING INK WITH INFRARED LAMPS
CUSTOMER.....SHAW BORDEN CO., SPOKANE, WASH.
TYPE OF BUSINESS.....PRINTING AND BOOK BINDING
SIZE OF BUSINESS.....TWELVE EMPLOYEES
SERVICE CO.....THE WASHINGTON WATER POWER CO.

Prepared by T. N. Hunt and Albert Gruber for the Industrial Section

This firm was having trouble drying inks on their ruling machine as these inks were applied to ledger sheets. This process consists of ruling colored lines on paper sheets to be used in large loose-leaf accounting record books and all kinds and sizes of ledger sheets and accounting book sheets.

The ink used consists of chemically colored pigments dissolved or suspended in distilled water then applied to the paper sheets through capillary fed ruling pens as the sheets are passed on a canvas conveyor under the pens, thus permitting the simultaneous application of several colors of ink in straight lines on the sheets in a single continuous process.

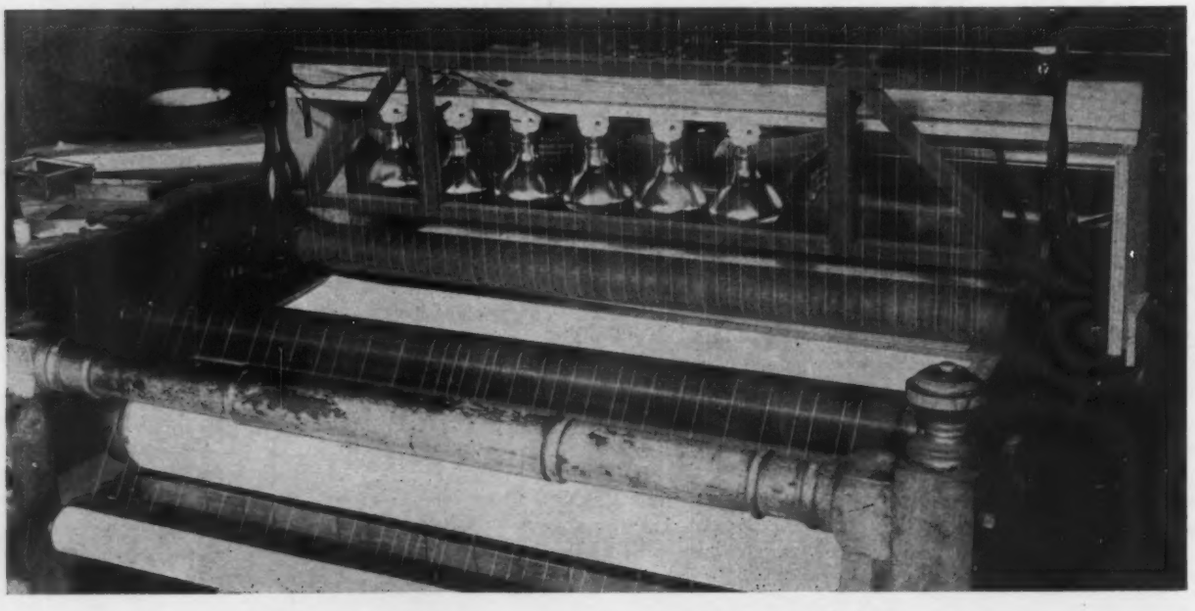
Strip heaters and space heaters of several kinds had been used in past experiments for drying this product, but had failed to do a satisfactory job, since the drying was slow and not done soon enough after the application of the ink to prevent moisture absorption by the paper. Moisture absorption on long ruled lines caused the paper to warp and prevented the operator from cross ruling the paper until after it was thoroughly room dried. From 2 to 2½ kw. of space heaters were used and the heat blown on the sheets with fans, but this failed to dry the moving sheets fast enough to prevent ink smearing as the paper was piled at the discharge end of the machine.

We suggested the use of infrared heat lamps as a solution for this problem, and on May 26, 1940, installed a bank of four 250-watt units on the machine. We believed that by taking advantage of the intense heat zone produced by these lamps and establishing this zone on the inked surface immediately after the application of the ink, we could prevent the moisture absorption by producing almost instantaneous drying of the ink on the surface of the paper. The experimental equipment proved this belief to be true, and the results obtained were so satisfactory that the customer immediately ordered six 250-watt "inbuilt" reflector units and the permanent installation was made on June 5, 1940.

Advantages

1. Rapid and satisfactory drying of the product.
2. Warping of the paper was prevented because the application of heat was made soon enough to prevent moisture absorption by the paper.
3. Simple and flexible attachment of the heating device to the machine and the process.
4. Less heat loss to the room air.
5. The machine production was increased by approximately 36% because of the prevention of ink smearing as the paper was piled which permitted the machine to be operated at higher speed.

In the case of cross-ruled sheets, we expect their production to be greatly increased since the sheets can be immediately re-run through the machine without waiting for them to room dry.



NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION

Utilization Data Sheet No. 31

SUBJECT .....ENAMEL BAKING OVEN
PLANT .....ABBOTT-LANE CO., PORTLAND
BUSINESS..MANUFACTURERS, PREFINISHED WALL PANELS
SERVICE COMPANY..PORTLAND GENERAL ELECTRIC CO.

Prepared by C. W. Brissenden
for the Industrial Section

The electric baking oven described in this article was designed by A. H. Kuriloff of the Abbott-Lane Co. to perform the exacting job of baking various modern synthetic coatings on pressedwood panels four feet wide, in lengths up to twelve feet. The following requirements were of major importance:

1. Perfectly uniform curing over the entire surface area of each panel; 2. Accuracy of temperature control to within 1½ deg. F. at any point in the range 135 deg. F. to 300 deg. F.; 3. Economy of operation; 4. Cleanliness; 5. Safety; 6. Provision for enlarged capacity in the future.

Solution

These requirements were met, in the order as given above, as follows:

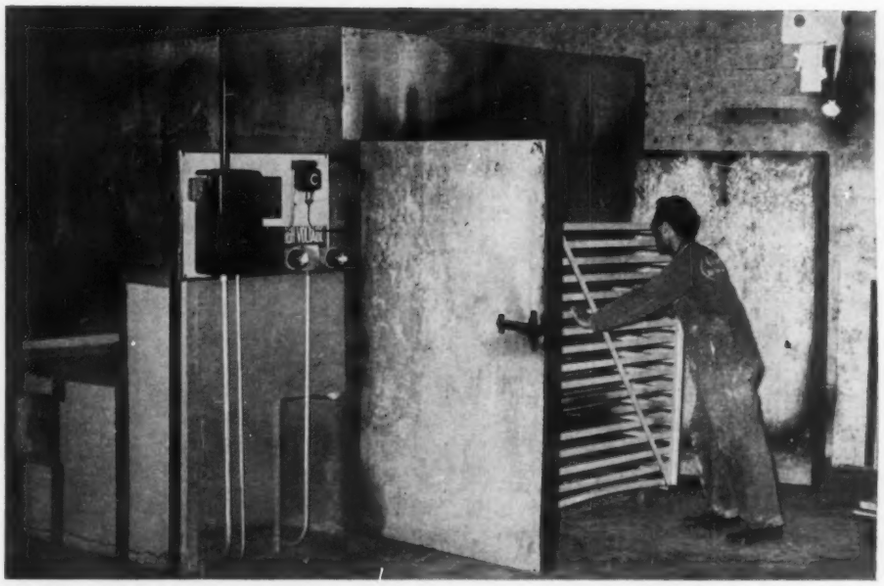
1. A high pressure air distributing system was carefully designed to provide an even flow of heated air across the width of each panel. The panels are stacked flat in an iron frame, one above the other and 3 inches apart. The oven box is 8 ft. by 8 ft. by 12 ft. net.

2. Temperature required is approached by predetermined manual setting of two three-speed controls. Modulating control is approximated by allowing the last heating stage to float on automatic thermostatic control, with the actuating bulb in the return air stream.

3. The customary air-drying period of ½ hour to one hour before baking was eliminated by introducing the panels immediately into the oven after spraying. By installing only 20 kw.. which is less than such a design would normally require, the longer heating-up time replaced open air-drying, at a saving in installed kw. and stand-by charge.

Conservation of heat was secured by using four inches of rock wool insulation between sheet steel walls.

Recirculation was employed, with a minimum quantity of outside air for fume dilution and ventilation.



4. All air brought into the oven passes through filters on the suction side of the oven blower.

5. Safety features incorporated were:

a. Adequate outside air for fume dilution and ventilation.

b. Automatic safety relief air damper in the oven box.

c. All heating equipment in ductwork outside the oven box.

d. All heat is black heat from fin type electric resistance heaters in the air stream.

e. Heating elements are electrically interlocked with blower to prevent burning out elements if blower becomes inoperative.

6. Oven capacity may be doubled by adding additional heating elements, lengthening the oven box and speeding up the blower.

Equipment Installed

Item	List Price
1—8 ft. x 8 ft. x 12 ft. Galvanized Steel Oven insulated with 4-in. Rock Wool, equipped with supply and return Ducts	
10—SEF 24 Chromalox, 2000 watt elements	$59.00
2—Three Heat Switches	5.00
1—Partlow Temperature Controller	55.00
1—60 Amp., A.C. Contractor	23.00
1—30 Amp., A.C. Contractor	12.00
1—¾ Hp. Blower	....
1—¼ Hp. Manual Starter	24.00

Westinghouse Sales Auditions End

TO hear yourself give a sales presentation is one of the possibilities that modern sound equipment offers to sales training. Salesmen of Westinghouse appliances throughout the country have just finished a $75,000 sales training program of that character of which the Pacific Coast winners have been announced by Elbert Kramer, sales application manager for the Pacific Coast. W. L. Willford, Pacific Gas and Electric Co., salesman of San Jose, was judged the Pacific Coast winner of the range audition; Al Moore, salesman for Good Housekeeping Shop, Oakland, the winner for the Pacific Coast on refrigerators. Of the 450 salesmen in the Coast region making the "Sam's sales auditions", these two won both their district prizes and the division prize.

Other territorial group winners were: for Los Angeles territory on refrigerators, Harlow Alabaster of Nevada-California Corp., El Centro; for ranges, Tom Crosbie of Nevada-California Corp., El Centro; Seattle: for refrigerators, A. G. Campbell, Bon Marché, and ranges, Roy Motteler, Puget Sound Power & Light Co. For the San Diego territory on refrigerators, Merritt A. White of Harrington's Appliance Service, San Diego.

Judges in each case were other dealer-salesmen. For the final winners, the judges were Elmer Larsen, Turner Hardware and Implement Co., Stockton, Ralph Carlson, Turlock Irrigation District, and Joe D. Salvo, Hartman Bros. Ltd., San Jose.

Technique of the sales training program was effective. With a recording machine, distributors in each territory recorded individual auditions of five minute sales talks by the contesting salesmen. No name was affixed to the record, only a number. When the auditions had been completed, a meeting was called of those participating in each division. Here again the records were played to the entire group without identification. A vote was taken then by the contestants themselves. No visitors or officials were allowed to vote. The salesmen picked their own winners in each district and discussed the sales presentations in general.

During the playing of each record, Kramer kept a score sheet that he had developed on which to note the highlights of each salesman's presentation. These score sheets themselves proved very revealing and formed the basis later for his discussions of the sales presentations with the audience.

At the close of the first part of the meeting, the records were given back to each salesman, except those of the winners which were kept for the division prize. In the case of the first prize winners, the records will be sent to Mansfield, Ohio, for judging in the national contest.

To crystallize the sales value of these auditions, Kramer then gave the salesmen a personalized analysis and talk in which the good qualities of the various audions were discussed. He then called their attention to the fact that the sales talks had predominantly been of the product itself.

Recalling to their minds two fundamental principles of selling, namely, that the salesman must classify his prospect, and second, talk in line with that prospect's special interest, he went on to illustrate how the specific features which

(Left to right) Al Moore, Good Housekeeping Shop, Oakland, winner of San Francisco district refrigerator "Sam's Sales Auditions" prize with W. I. Powell, Westinghouse Supply, San Francisco, and A. B. Murphy, sales development manager, Westinghouse, San Francisco

they had all used in their sales talks would be given far more potency by visualizing to the prospect his particular interest in terms of the service he would receive from the appliance.

Thus he made the point that salesmen should not be merely animated catalogues but should personalize the appliance strongly to the prospect.

At the conclusion of the meeting, all those who had participated were knighted by being presented a pair of red suspenders.

Letters of commendation from dealers, department stores and utilities have been enthusiastic over the constructiveness of the sales audition idea and of the value of the personalized discussion of them by Bert Kramer following the judging, and compliment Westinghouse for furnishing a sales training program so much needed in the merchandising field.

● TOPPING THE 1,000 MARK for number of ranges and water heaters sold in a single month, the Portland General Electric Co. congratulated its dealers for breaking that record in July with total connections of 1,015 electric ranges and water heaters. Of the total, 696 were ranges and 319 water heaters. Connections in Portland showed an increase of 87 per cent over the same month a year ago and outside of Portland an increase of 66 per cent over July, 1939, according to George Madison, dealer promotion manager.

Visualizer

Kitchen promotion picture builds sales for Idaho Power

Up in Idaho, Kitchen Planning demonstrations are more easily conducted and get better attention, thanks to a new Kitchen Visualizer originated by Pocatello division sales manager S. C. Rhoads, reports Margurette Reinhart, Home Service Director for the Idaho Power Co.

The visualizer is an easel-backed picture showing an old fashioned kitchen with coal stove, wash stand, ice box, bare lamp bulb, and unhandily arranged cupboards. Fitted over this picture are four celluloid panels on which are illustrated the modern electric kitchen appliances which transform the old fashioned kitchen into a modern, all-electric, convenient one.

The first panel, fitted into a set of guides, masks out the old fashioned ice box and sets in its place a modern electric refrigerator. Slide number two replaces the coal stove with a modern range. Next come a combination sink and electric dishwasher and a cabinet-type electric water heater. The fourth panel adds modern lighting, handy cupboards, work tables and small appliances, and modern kitchen decorations.

The Kitchen Visualizer was built by Charles Halford, floor salesman in the Idaho Power Co. store at Pocatello. It measures 24 by 30 in. and fits into a handy carrying case.

The visualizer is used by Home Service advisers in club lectures and meetings to acquaint housewives with the advantages of a planned kitchen and to offer them the services of Idaho Power Company's Kitchen Planning department.

Results which Home Service Girls have had with the Kitchen Visualizer have been very good, Miss Reinhart declares.

PRINT IN BINDING

ELECTRICAL WEST

SALES GUIDE

YOUR OLD RELIABLE

Seasons come and seasons go but the good old washing machine goes on just the same. It's the dealer's stand-by, the salesman's old reliable. All year 'round there's the need to wash clothes. That in itself gives the washer the steadiest market of all appliances. Even so-called saturation doesn't affect it. A certain number of new washers are just going to be **bought** every month anyway. The trick is to make this business worth your while. Competition is keen and models and prices range all over the scale.

To make it really profitable, on top of just "bread and butter," it is vital to sell up. That's where the profit or commission is to be made.

Just "turn-over" isn't very fattening. It takes the higher sale to put a bit of jam on the bread.

The dealers and salesmen really making money in washers and ironers—(yes, some do, despite low priced competition, believe it or not)—say that the secret is concentration. Not Yogi stuff, but they say they do best when they put all they have into selling a feature model.

Sure, they have to know the others in the line and in stock in order to be able to drop down to them if they have to.

But it is their enthusiasm for the feature model, their thorough presentation of its good points, that raises their average into the money. You see, there's no reason why a woman shouldn't buy the lowest priced model in town if she's not shown why your featured model is worth more.

It will be worth your while to tie-in to the fullest with National Washer and Ironer Week—Oct. 19-26

HOME LAUNDRIES

SEPTEMBER

1 9 4 C

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OH, BY THE WAY—

1. Best part of the solution of "wanderlust" can be found in rearrangement of stock so that you can take your prospect direct to the featured appliance where you can give the sales story on it without that danger. While it is convenient to arrange the whole line in a row, perhaps, it is better to set apart the featured appliance on which you are prepared to give the best story.

"By the way," you can interrupt yourself, "let me show you the excellent new things that have been done to this washing machine to make your handling of it so much easier."

It is subtle flattery to act as though you expect the prospects to want the very best. If they protest, you can still urge that they see the feaured model first and then look at the rest of the line later.

Reason for this is that **you** can do a better job on the washer you **know** best, the one you have practiced up on. You are naturally most enthusiastic on the first model you show and explain. Might better be the best one you have in stock. Then, if you have to, you can back down to lower priced models. That's much better than trying to hoist a sale up from the lowest priced one.

It's a cinch you can't do your best on five or six models, interrupted, just as you start on each one, to tell about another. Your best bet is to specialize on the model that has the most to offer—to you and to the customer.

"Price," you can explain at the mention of it, "doesn't mean so much if you get the kind of washer that will do you the most good."

Closing---when

1. Wanders from model to model in the display.

This is likely when you have too many models and makes in one display. When you are trying to tell her about one model her eye is on another. She only half hears you, interrupts you to ask about another model nearby. When you go over to that and start to explain it she's skipped to still another.

SUGGESTED BY

your prospect---

2. Doesn't think she wants an ironer.

Few women do think so. Nobody questions a washing machine's ability to do its job, but few women know the same about an ironer. Some are even prejudiced and do not want to try. Others are afraid they can't operate it. Shirts scare others. They do not think they are justied in spending so much for one.

2. Hardly any woman does. She doesn't appreciate what it will do for her until you dramatize it to her somehow. Lot's of salesmen have worried over how to do it. Best and simplest way is one that has worked like a charm for a crack salesman.

He knows that housekeeping is hard on any woman's feet; there's so much standing and walking to it. So he starts right in—

"Oh, by the way, why don't you give your feet a chance to rest too?"

"What do you mean?" is the usual query.

"Well on ironing day," he says as he **acts out** his words, "you know how it is. You have to do all that standing while you iron the washing. Nothing is harder on you than the standing. You are hot from standing over that hot iron so long, your feet begin to ache, and so after you stand it as long as you can, you kick off one shoe, then the other."

This usually brings a smile of understanding that makes the rest easy to tell.

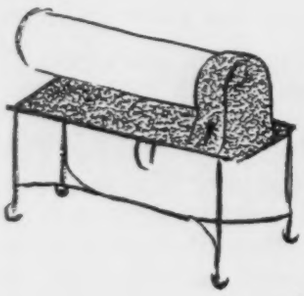
"You are ironing away, your hair down in your eyes; you are hot—and the door bell rings! You realize you're not fit to be seen by anybody, but you tidy up your hair, start for the door, remember your shoes, try to put them on, but can't. When you do greet your friends at the door you feel like a wreck.

"Now with an ironer, you've been sitting down, you are cool and rested and no matter who comes, you are at your ease—Let me show you—"

YOUR SALES ALLIES

PUGET SOUND POWER & LIGHT CO. . WASHINGTON WATER POWER CO. . PORTLAND GENERAL ELECTRIC CO. CALIFORNIA OREGON POWER CO. . UTAH POWER & LIGHT CO. . IDAHO POWER CO. . THE MONTANA POWER CO. ROCKY MOUNTAIN ELECTRICAL LEAGUE

HERE'S AN IDEA YOU MIGHT TRY



-- on Ironers

Put an ironer next to every washer in the display, advises one experienced sales manager. Then it is an easy matter to take the washer purchaser to it with the suggestion that she has taken care of half the job and needs the ironer to do the other half. "If she asks about it doing shirts or dresses," he advises, "say 'yes, but that at most is only 10 to 20 percent of your ironing. Let me tell you about doing the 80 to 90 percent of your ironing so much easier.' "

Shirts, another successful salesman advises, "tell her, sure she can do shirts later on, but the thing to do is to become familiar with the controls first on easy things, as in learning to drive a car. Then let her come back for instruction on shirts, etc. and she will not have to pay any attention to the controls, only to the instruction."

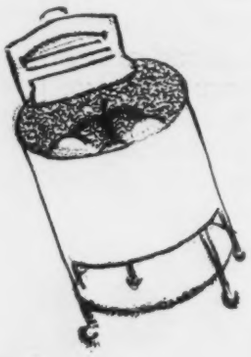
Portable ironers offer a big new opportunity. Big sales increase was made by one group of dealers who worked to keep the washer payments high enough to cover the addition of the portable ironer at no increase. Then when delivering the washer, a portable washer was brought along to try with the first washings. It was easy to sell the idea that two or three more monthly payments at the end of the contract would take care of the portable ironer.

-- on Washers

"One Month's Washing Free" is an offer made on a return postcard by Wahl's of Bellingham. The card is numbered, has an expiration date, and is used as a follow-up on a prospect that hasn't bought yet. Even the acceptance part of the card tells a sales story —"I shall be glad to know how the —— washer helps avoid colds, rough hands, washday backache, saves time, drudgery, wear on clothes and laundering expense. I'd like to take advantage of your free offer for one month beginning——" it says.

Used Washers advertised in want ads bring in prospects too. One dealer places brand new washers on display in among the used models in the bargain room. The contrast helps to change many prospects over to buying a new washer instead, if the payments are nearly the same.

Downstairs appliance department in one big store had trouble bringing floor traffic down the stairs. Free paper shopping bags are now given customers upstairs in which to take home purchases. When they get home they find sales literature from the appliance department inside, asking them to stop in next time.



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Trade Dinner

S. F. Merchandise Mart holds annual radio-appliance event

A highlight event of the Western Mart's recent "Golden Market" in San Francisco was the annual Western Radio & Appliance Trade Dinner at which two national leaders in the industry were guest speakers.

Lee McCanne, of Rochester, N. Y., assistant general manager, Stromberg-Carlson Telephone Mfg. Co., thoroughly discussed why "Radio Hits a New Selling Stride," and E. Carl Sorby, of Rockford, Ill., promotion director, Geo. D. Roper Corp., sounded a warning note in his talk, "Sell 'Em UP, or Else!"

"Lack of profits in radio retailing today," said McCanne, "is largely due to concentration on selling small 'accessory' sets for use by individual members of the family. The average list price for the 8,000,000 radios sold in 1939 was only $33 . . . and over half of the 28 million radios in the living rooms of this country are at least 7 years old.

"The surest way to secure again the greater profits once enjoyed in radio retailing is to raise the unit of sale level. Frequency Modulation, an entirely new system of transmission, offers a new way to achieve that goal. For the installation of a new band in the receiver equipping it to receive the new F-M programs, in addition to the regular broadcast and short-wave bands, means an additional $50 in the retail price of the set."

McCanne stated that probably 200 stations will be equipped for F-M transmission of programs in 1940, and that close to 200,000 sets providing for F-M reception will be sold this year. He also claimed that F-M radios would have little effect on utility load. Practically all the leading radio manufacturers will soon be marketing sets equipped to receive both the present A-M and the new F-M broadcasts. Among the basic improvements provided by F-M he mentioned "absence of static . . . elimination of any interference between stations . . . improvement of tone quality that covers a most extensive range of vibrations and overtones . . . true-to-life reception regardless of weather conditions . . . even quality of reception by day and night . . . removal of the need for monitoring in the broadcasting studio."

An interesting demonstration of F-M reception was staged by McCanne, with the cooperation of radio station KSAN, whose broadcasting studios are located in the tower of the Western Mart. A "two-flea power" F-M transmitter had been temporarily installed there for the occasion. It broadcast numbers by the evening's entertainers to the dinner audience. Reception came through one of the new F-M-equipped radio receivers on the stage of the Mart Club, with accompanying explanatory remarks by McCanne. J. T. Templeton, director of sales, H. P. Basford Co., was chairman of the dinner.

Range Campaign

Inland Empire Assn. drive nears successful close

"Reap Range Rewards!" is the slogan of the 3-R range campaign, adopted by the Inland Empire Electrical Equipment Association for the purpose of stimulating summer range business, according to R. B. McElroy, general secretary of the association. The campaign is to see a three-months' system-wide range sales activity, covering the six divisions of the association, with 2,000 range sales expected by Aug. 31.

Range sales for the first five months for the association for 1940 present a 63 per cent of increase over the first five months of 1939, while May, 1940 increased 93 per cent in range sales over May, 1939. In view of this accomplishment, the summer months seem to be exceptionally good range months this year. Participating are approximately 130 range dealers over the territory.

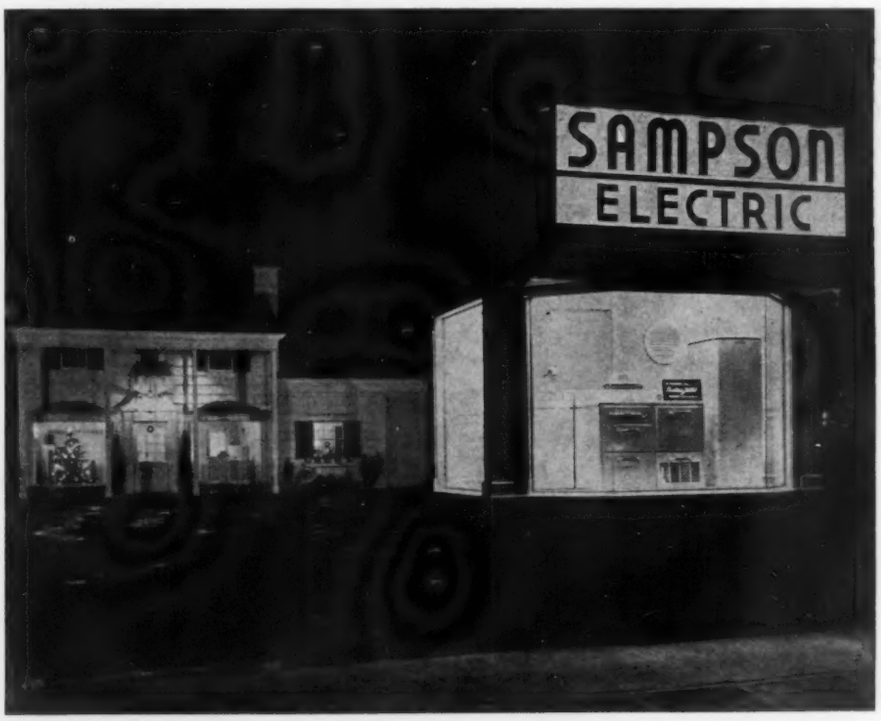
Reverse Advertising

Canadian merchants have fun with local newspaper promotion

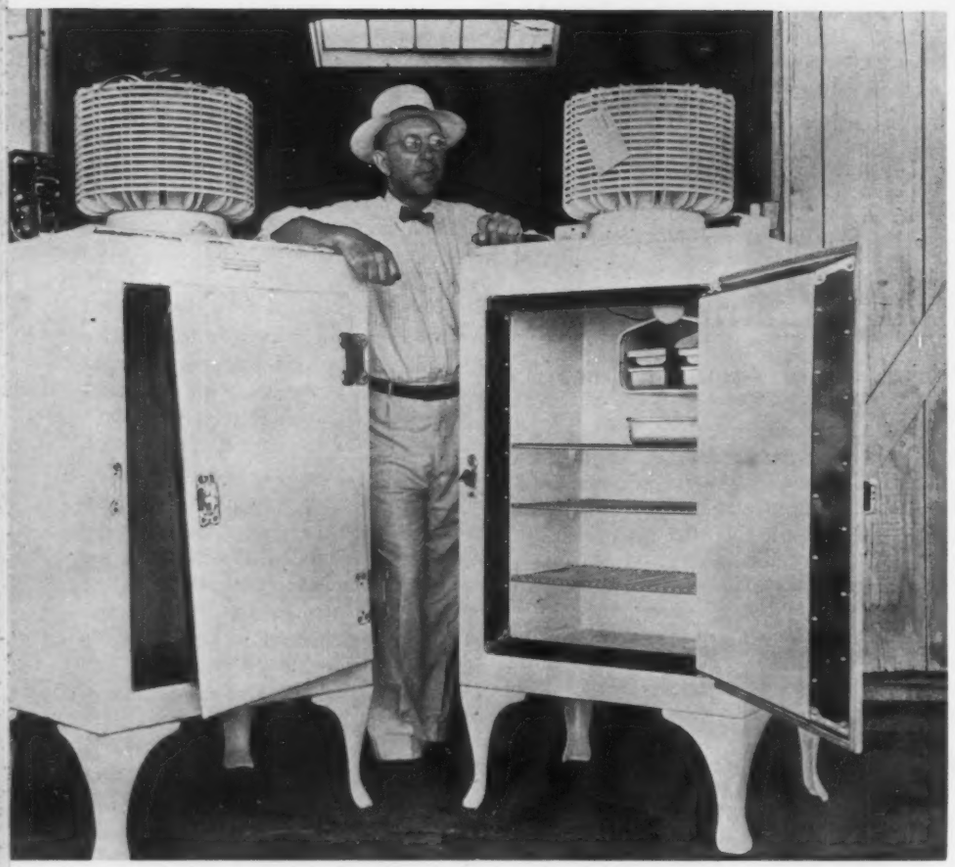
Reverse advertising was used with much success by merchants in Penticton, B.C., recently in a special page in the local newspaper giving advice on how to secure a "rotten vacation." A full page was devoted to these unusual advertisements in which representative merchants in various lines of business gave their expert advice on the most efficient way of completely ruining a vacation and the summer months.

Betts Electric and the Pentokan Electric both ran advertisements on this page. The Betts Electric suggested that the best way to spend a rotten summer was to stay away from the cooling draft of their electric fan, which only cost a small sum, and to keep cooking over a hot old-fashioned stove and buy oil lamps instead of their modern, economical lighting equipment.

The Pentokan Electric pictured the cold meat slightly green at the edges, the butter running in dribbles off the plate, the milk turned sour and many other household tragedies and explained that this and more was possible and easy to obtain if Penticton residents would refrain from buying a refrigerator in their store.



SAMPSON ELECTRIC CO., Los Angeles electrical contracting firm, has dramatized electricity through the use of such spectacular displays as these. The company's entire building has become an illuminated attention-getter. Office and workshop are housed in the handsome Colonial building at rear left with various appliances featured in the small building at right



Refrigerator

Enterprising Los Angeles refrigerators, helps to solve many Southern California

William Vogel stands between a used refrigerator on his left and a reconditioned "Vogel box" on his right. Therein lies the story of his prosperous venture, building new from old

ALTHOUGH Wm. Vogel of Los Angeles is not a doctor, he has cured many Southern California electrical dealers of a bad headache—refrigerator trade-ins. Vogel, president of the Electrical Appliance Service Corp., reconditions used boxes of any make so that they look and operate like new, for a flat price of $20 for a one-door model up to 10 cu. ft. or $25 for a sealed motor job or two-door box. His refrigerator reconditioning plant is the only one in the west doing a complete job of this kind.

Pioneering is an old story to Vogel. Fifteen years ago he began in a small way the business which today is the largest factory parts and service organization for electrical household appliances in the world. He centralizes service for some sixty manufacturers of major and small appliances, carrying parts which inventoried about $62.500 at the end of 1939. To make numerous facilities of this business conveniently available, he has compiled catalogues which are the most complete of their kind in existence. Forty people are employed at his plant.

Sealed-unit mechanisms are being rebuilt here in the Vogel plant by experienced mechanics

When a Southern California woman needs a new part for her vacuum cleaner, she wants it right now—not in several weeks, which is about the time it takes to get it from the factory. She can buy it directly or through her dealer from the Electrical Appliance Service plant at 918 S. Flower St., Los Angeles, and with modern methods of communication and transportation, she can have it the same day or next. This appliance service means a lot to the customer, dealer, service company and manufacturer.

Vogel entered the refrigerator reconditioning business about a year ago. Noticing that electrical dealers barely were breaking even or were losing money on trade-ins for want of sticking to the blue book trade-in allowance and a central plant for reconditioning boxes, he evolved his present plan to take the hit and miss angle out of this phase of selling. It is based on the plan of a company which has been operating successfully in Philadelphia for a number of years. This is how it works:

Each dealer using Appliance Service facilities enters into a contract to have all work of this kind done by the com-

Hospital

business man doctors old the trade-in bugaboo for electrical dealers, salesmen

pany. The low reconditioning price is based on volume, and the company cannot give it to a dealer bringing in a single box.

The dealer delivers his used refrigerators to the plant and calls for them when they are finished. All work is done for cash.

Every refrigerator which is reasonably complete and saleable is thoroughly reconditioned, including repair and reconditioning of the mechanical unit, refinishing interior and exterior of the cabinet, replacement of hinges, latches, trays, shelves, door gaskets, and various changes to increase operating efficiency. The reconditioning plant is separate from the service plant and is located at 2828 Newell St., in the city's industrial district. Five thousand sq ft. of floor space is included, and the plant is equipped with all the special machinery necessary for a trained staff of ten men to do a complete overhauling job. Roscoe Miller, well known Los Angeles service man, is the superintendent.

Reconditioned boxes are guaranteed for 90 days from date of installation, the warranty covering service and parts within a radius of 20 miles from Los Angeles, which is the business area of the company. An improper cycle installation voids the guarantee.

The dealer's contract makes it necessary for him to abide by Appliance Service's decision as to whether the refrigerator is suitable for reconditioning at the flat price. If it is not, the dealer has the alternatives of arranging for a special price covering reconditioning, taking back the refrigerator or accepting from Appliance Service one-half of its National Market Index value. In this case, the box is used for salvage.

The $25 reconditioning service on sealed motor boxes includes complete rewinding of the motor, change to a modern light oil and other efficiency-increasing changes. According to Vogel, the present popularity of sealed units is one basis for his business. The ordinary service department is not equipped to do a good job on rebuilding this type of unit, and his company has all the necessary special equipment. Cleanliness is one of the main factors in working with sealed motors, he states. The motor has orifices smaller than the head of a needle, and tiny particles of dirt can cause trouble if the work is not done carefully.

If refrigerators located outside of the 20-mile radius of Los Angeles have defective major parts—motors, compressors or complete units—these may be returned to Vogel's factory, where they are exchanged free of charge and reshipped prepaid. Regular service of this kind has been provided dealers as far north as Taft and Watsonville.

"The 1,200 boxes which were reconditioned at our plant last year looked like the day they were uncrated, and they operated as well or better," Vogel states. "Of course we cannot change the design to make them look like today's latest models, but we can give them their original good appearance and increase their efficiency so that they are very acceptable to families who cannot afford to buy a new refrigerator."

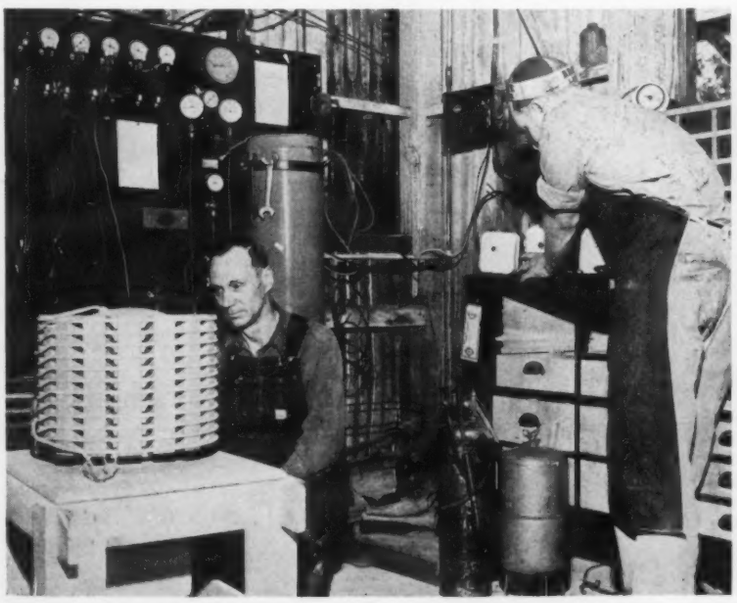
Adherence of dealers to blue book trade-in allowance for used boxes is one of his favorite promotions.

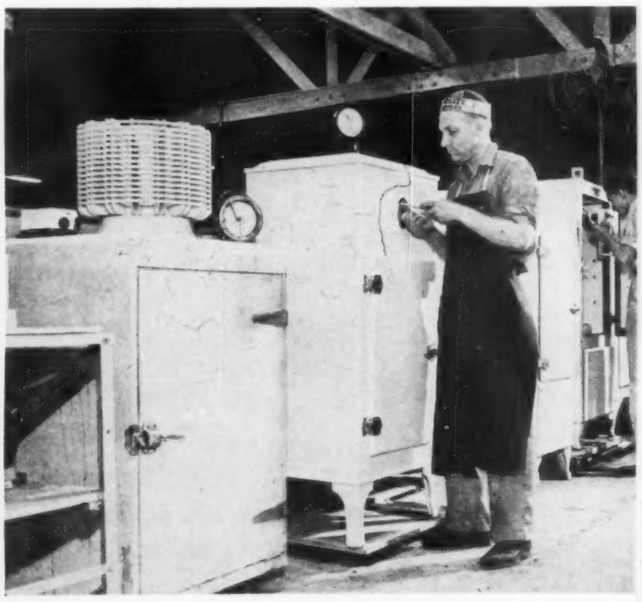
"Most dealers allow too high a price for the old box and shut themselves out of a re-sale profit," he avers. "If a dealer gives only the NMI listing, he easily can add the reconditioning cost and sell the box for a profit. For example, if he allows a blue book price of $10 for a used box, he can pay $20 for having it reconditioned and sell it at a profit at a price of $59.50.

"I believe we are providing a necessary service in giving the dealer a guaranteed reconditioning job. Unless the work is done right, the dealer loses money, so the progressive dealer quickly sees the advantages of having his boxes overhauled by experts."

Dealers and service men in the Los Angeles area receive regularly Vogel's "Electrical Appliance Service News," a four-page leaflet giving news of the industry and of his company's activities. His plant has its own mimeographing and multi-lithographing department.

Men in left picture are testing controls and putting in new refrigerant while those at right are giving "Vogelized" refrigerators their final inspection and tests before refinishing





Window Displays

Washer-ironer association to sponsor contest again

Remembering the success of National Washer-Ironer Week's window display contest in 1939, the American Washer and Ironer Manufacturers' Assn. again will award cash prizes in a similar competition October 19-26, according to Joseph R. Bohnen, Chicago, executive secretary.

"Identical prizes will be given in each of three divisions of stores, classified to hold competition on an equal basis," Secretary Bohnen said. "To obtain greatest possible enrollment, a special cash award will be given to every manufacturer or distributor salesman instrumental in first lining up any window that proves to be a prize-winner. Windows will be judged on the general basis of attractiveness and selling appeal. Use of the display card to be supplied dealers by the manufacturers will not be obligatory."

The prize schedule: Class A—Large department stores and utilities: First, $200; Second, $100; Third, $50; four fourth prizes of $25 each. Class B—Appliance Shops and Hardware Stores, and Class C—Small department stores, furniture and all others, same as Class A. For "nominating" salesmen in each class: First, $100; Second, $50; Third, $25, four fourth prizes of $10 each.

Future Campaigns

British Columbia Electric Railway Co., Ltd.—Fall campaign on electric ranges and refrigerators scheduled for September. Annual employee lamp globe campaign commences Sept. 15 and will continue into October.

Electric Appliance Society—Laundry equipment campaign for September.

Idaho Power Co.—15th Annual lamp globe promotion starts Sept. 3 and will last until Oct. 24. This is primarily a company project. Annual fall Better Light Better Sight campaign begins Sept. 3 and lasts until Dec. 24. Fall drive on electric cooking and water heating. County fair displays at Halfway, Ore., Twin Falls and Eastern Idaho district fairs during September.

Nevada-California Electric Corp.—Refrigeration campaigns set for Sept. and October.

Pacific Power & Light Co. Electric range promotion for Sept. and lighting campaign for October. Radio shows to be held in Sept. and Oct. according to dealer interest which is now being tested. Company expects 30,000 people to attend showings of 1941 radios by all dealers based on past four years' experience with radio shows.

Puget Sound Power & Light Co.—Water heater campaign ran in August with dealer range campaign set for September. Exhibit will be held at western Washington Fair.

San Diego County Bureau of Radio and Electrical Appliances—Sam Worswick, appliance field lecturer, to speak at four lectures beginning Sept. 6-13. Refrigeration advertising run in newspapers through August.

Southern Colorado Power Co.—Range and water heater campaigns in August and continue through September with IES lamp campaign. Mazda lamp and IES campaign will run through October.

Utah Power & Light Co. and Western Colorado Power Co.—Lamp bulbs, home lighting equipment and stoker campaign for September. The latter two campaigns for October.

APPLIANCE SALES REPORT, 1940

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.[1]	Northwestern Elec. Co.[2]	Montana Power Co.[3]		P. G. & E. Co.[4]	Pacific Power & Light Co.		San Diego Cons G. & E. Corp.[5]		Southern Calif. Edison Co., Ltd.[6]		Utah Power & Lt. Co.[7]	Wash. Water Power Co.
			Curr.	6 Mos.		Curr.	6 mos.	Curr.	6 mos.	Curr.	7 mos.		
Ranges			656	1,127		258	1,230	45	270	210	1,064		
Water Heaters			77	163		199	778	40	270	59	348		
Air Heaters, aux.													
Air Heaters, 220													
Refrigerators			2 914	5,156		1,700	5,533	1,150	5,725	6,199	29,794		
Dishwashers													
Washers			1,090	3,107		703	3,639	475	2,625	2 706	16,443		
Ironers			107	340		47	265	70	420	323	2,144		
Vacuum Cleaners			393	1,532		199	953	260	1,560	794	5,841		
Radios			2,073	7,177		1,140	6,833	1,250	6,625	6,233	37,653		
Mixers								100	600	225	1,675		
Cookers, Casseroles								65	360	30	202		
Irons								600	2,825	1,043	6,589		
Waffle Irons								150	725	277	2,138		
Toasters								450	2,200	426	3,087		
Table Stoves			1,248	3 825				75	575	203	1,250		
Heating Pads								65	680	65	987		
Curling Irons										28	193		
Coffee Makers								550	2,675	222	1,655		
Sewing Machines								125	690				
Clocks								550	2,675	422	3,059		
Fans										733	1,591		
Floor Polishers													
Sun Lamps										17	175		
Reflector Lamps													
Misc. Lamps													
Shavers										153	1,288		
Yard Lights													

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers for 3 months.

[2] Lists appliances sold by dealers in Portland area. Figures compiled by Northwestern Electric Company.

[3] Combined dealer and company sales from report of Montana Power Co.

[4] Figures are being consolidated with San Joaquin Power and are not available this month.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures include fans, curling irons and sun lamps.

[6] Includes reports from dealers on San Joaquin Valley system of company as well as Southern California areas served.

[7] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

Citrus Sales, Inc.

Southern California ranchers use electricity to move produce

ANY electrical application that materially improves the economic lot of the farmer receives attention from the rural electrification specialists in California. In southern California one such development has been undertaken by citrus ranchers who have started a cooperative activity to increase local consumption of surplus fruit. Electricity is taking a prominent part in the program.

Twelve California Fruit Growers Exchange packing houses have formed Citrus Sales, Inc., a cooperative organization promoting the sales of citrus fruits and juices to the motoring public. The Exchange is one of the largest and most successful grower cooperatives in the world. Attractive stands are being located on the grounds of service stations throughout southern California, Arizona and Nevada. The first was opened at Downey, Calif., followed in quick succession by others in Indio, Calif., and Las Vegas, Nev.

High quality oranges, lemons and grapefruit are offered for sale, fresh each day from one of the member packing houses. Lemonade and orange and grapefruit juice are served also, as is a new orange drink in which orange juice is combined with orange ice.

Electrical applications at the stands include motor-driven juice extractors, electric refrigerating equipment and a small 5-gal. electric water heater for dishwashing purposes. Fruit juice stands with their comparatively limited hot water requirements, should provide an excellent market for these small water heaters.

● A RESEARCH ASSISTANTSHIP has been established under the scholarship arrangement initiated by the California Committee on the Relation of Electricity to Agriculture and the University of California. Harry Stierli, a graduate in electrical engineering, has been appointed to the position and will begin his work in August. Half of his time will be devoted to a research problem involving the use of electricity in agriculture, the other half to study leading to a master's degree.

REA Report

Figures show many revealing facts in rural electricity areas

Nearly nine out of ten farm homes on REA-financed electric lines have radios, more than eight in ten have electric irons, more than half have electric washing machines, and nearly a third have electric refrigerators, according to REA's third annual utilization survey, just made public by Administrator Harry Slattery.

The survey, which shows the extent of use of various electrical appliances on newly electrified farms, is based on questionnaires returned by 43,000 families served by 82 REA-financed systems in 27 States. While the systems have been in operation for periods ranging from six months to a little over four years, Slattery said, the average length of service for consumers reporting is 13.6 months.

The survey reveals the following percentages of use for various appliances: radios (non-battery) 87.5%; electric irons 84.1%; washing machines 55.3%; refrigerators 31.6%; toasters 29.4%; vacuum cleaners 20.7%; etc.

Pump Testing Service

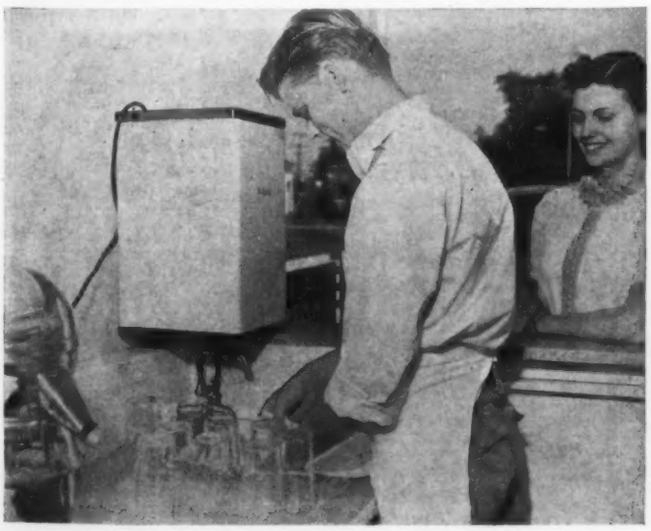
Statistics on tests reported by CREA

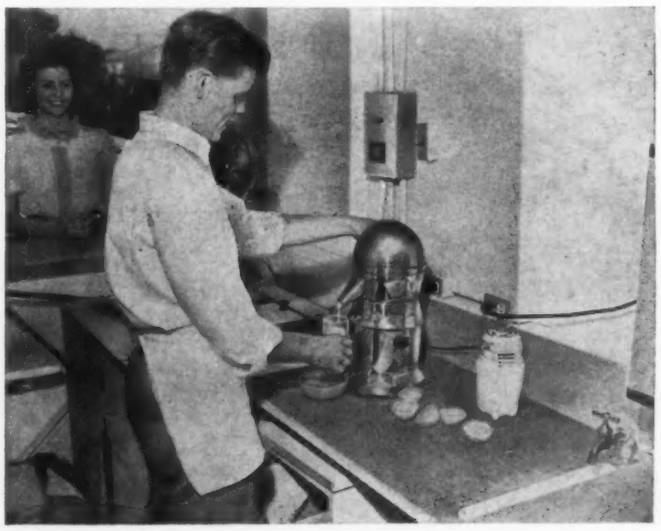
More effective use of electricity in irrigation pumping was induced by means of a pump testing service operated by six crews and requiring the expenditure of approximately $45,000 a year. In 1939, around 4,658 tests were made bringing the total including re-tests to 30,710 since this service was inaugurated. Pump efficiencies were increased and a measurable amount of money saved for farmers who were unaware of the inefficiency of their irrigation pumping installations. Many new agricultural uses of electricity which were developed by scientific research through studies of the California CREA were promoted for practical application by the farm advisers. The company has been an active contributor of both money and man power to the CREA since its inception 15 years ago.

In addition, close cooperation was maintained with a number of other agencies including the University of California Extension Division, high schools and future farmers of America, 4-H Clubs, farm bureaus and manufacturers' dealers and finance agencies.

● JOE K. ELLSWORTH, research worker with D. W. B. Herms on the California CREA project on control of insects with light, has been granted a degree of doctor of philosophy by the University of California for his thesis on this subject and his work in associated fields.

California fruit growers have banded together to dispose of surplus fruits through stands erected at service stations. Electricity plays an important part. In addition to operating refrigeration equipment, it runs a motor-driven juice extractor (left) and operates a small Hotpoint water heater (right) which supplies the water necessary for dishwashing and general cleansing





ELECTRICAL WEST

The All-Industry Magazine of Progress

Established 1887 and Incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity"

McGRAW-HILL COMPANY OF CALIFORNIA
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Must Rates Go Lower?

A LOT of people in the electrical industry are beginning to wonder just where and when the bottom will be reached in domestic electric rates here in the Far West. This is particularly true in the Pacific Northwest, where rate reduction has followed rate reduction until today the residential customer is buying electricity at rates that would have been attractive to industrial customers not many years ago. As a matter of fact, one is tempted to say that the present schedules in Oregon and Washington are as low as they can get without a large burden of the costs of electric service being passed on to the taxpayer in the case of municipal utilities, and without taking the cuts out of the hides of employees and stockholders in the case of the privately owned companies. Neither of these courses can be justified.

This rate situation brings into focus several relevant facts. In the first place, if the primary aim of the public ownership advocates has been "cheap" electricity for the public, then this aim has been accomplished. Certainly none of the existing or proposed PUD's, which would take over only portions of the properties of the private companies, could legitimately sell electricity more cheaply than these companies are selling it today. That being the case, then the prime reason for these publicly-owned utilities vanishes. In fact there are several reasons why the private companies should continue to serve. Removal of their property from the tax rolls would constitute a serious loss of badly needed tax revenues. The advantages of large integrated systems with several sources of power are essential for the national defense emergency. There are no services that could be performed better or more efficiently for the public under government ownership. Experience shows the contrary to be the case.

Sole beneficiary from these low rates is the customer. However, he does not benefit unless he uses more electricity to alleviate drudgery or increase comfort and convenience in the home. And low rates alone will not stimulate such use. Intensive promotion is necessary and promotion requires money. Thus if rates get so low that no funds are available for promotion, then the public fails to obtain the advantages of low-cost electricity.

In commending the utilities of the Northwest for their courage in bringing rates down to their present low levels, we add a warning—don't let the rates get too low.

Start Saving Now

HAVING lived beyond its means for more than ten years with little or no thought of the consequences, the federal government now has embarked upon an $11,000,000,000 spending program for national defense. With the money already appropriated the New Deal is devoting all its attention to expenditure and giving scant consideration as to how, when or where the money is to be raised. Instead there is placed upon the nation's credit a strain that imperils the whole federal financial structure. No one will question the purposes for which the money is to be spent, although we can decry the haphazard and lackadaisical defense policies of recent years that have forced the present program upon the country.

No intelligent credit manager would have permitted a business concern or an individual to run his financial affairs in this manner. In fact a customer who regularly spends more than his income would quickly be put on a cash basis. How long the federal government can continue to defy this simple economic law is problematical but unless some plan is evolved for funding this last $11,000,000,000 of debt, it won't be too long until the country gets a real taste of inflation.

Part of this defense expense can be met by taxation—in fact the people of the country are resigned and ready for more taxes — something which the politicians do not seem to believe. The rest of the expense could be met by a reduction

in the present costs of government — a general trimming all down the line. Many present expenditures could be cut out entirely. One class would include money spent on government projects that compete with private industry such as the electric utilities. To expect this to happen before the elections is just wishful thinking. That it may happen after the elections is a sincere hope.

San Francisco vs. Mr. Ickes

WESTBROOK PEGLER'S pet peeve—Secretary Ickes—has become something of a pain in the neck to San Francisco. The Secretary's latest edition on the Hetch Hetchy power situation has been rightfully characterized as an uncalled for and irregular invasion of the rights of the city by a federal bureaucracy. As reported in the news section, Secretary Ickes has arbitrarily defined the course which the city officials must pursue if the current municipal budget is not to lose the benefit of the income from Hetch Hetchy power. In setting up the program to be followed, the Secretary attempts to force a policy of government ownership in which he believes, upon a city that on eight separate occasions has voted down this doctrine.

It is unfortunate that San Francisco does not have among its officials an individual with sufficient courage to tell the Secretary in just which direction he might go. The city has made numerous attempts to arrange for the disposal of its by-product power in a manner that would satisfy both Mr. Ickes and the Raker Act. The former in each instance has said "No." Under these circumstances the officials of San Francisco would be justified in telling him that they have done their best, and then taking the whole case to the people. Unless our prognosis is entirely wrong, we are of the opinion that the public generally is beginning to resent federal domination and federal invasion of state and local rights. We do not think the people of San Francisco would particularly approve of the Secretary's attitude.

Since San Francisco officials have been forced to accede to the Ickes program or face the reverberations of a substantial increase in the tax rate, there is nothing to do but endeavor to work out a lease agreement until such a time as an amendment to the Raker Act can be put through Congress.

A Crime to Advertise

ONE of industry's major complaints against New Dealers is that they have succeeded in creating the idea among many people that any kind of success in business is almost criminal. Typical of the tactics employed is the anti-trust suit against some of the tobacco companies for their use of advertising. The complaint says:

> Said defendants have by extensive and continuous nationwide advertising and by various sales promotion schemes created and maintained such public acceptance and demand for their major brands that, the offering of such products for sales being a necessary adjunct to the conduct of numerous wholesale, retail and service establishments, such establishments are forced to handle the products of defendants and others even on unreasonable and arbitrary terms and at such prices.

If the use of advertising to create public demand and acceptance is a crime for the tobacco companies, then the electrical industry also is guilty of having made the American home a better place in which to live and of having raised the American standard of living to a plane not equalled anywhere else in the world. To use advertising to widen a market, to increase sales and hence to reduce costs to the customer has been one of the fundamental principles of economics that has made this country the best place in the world in which to live. To say that this is a crime sounds screwy, doesn't it?

A Year in Lighting

SINCE last September when the Illuminating Engineering Society met in San Francisco a year in which to apply new light sources has elapsed. Until then production of the materials and equipment for the widespread use of these new light sources had not progressed to a stage that was important. The industry was still on the verge of this potential change.

A year later the figures of production and application are impressive. But the interesting thing is not to be found in these figures. It is to be found in a walk through city business districts to see just how this new type of lighting is being used.

Fluorescent lighting is being used, as incandescent was and still is, both well and badly. Bare lamps, of both light sources, still predominate—at least the impression on the eye is that they do. Malpractice still exists, no matter what the source.

Such a casual survey would easily give the impression that nothing much had been gained by the introduction of fluorescent lighting, that the same abuses to which incandescent lighting had been subject were being carried over into flourescent lighting.

Deeper investigation, however, reveals the truer values of the light source recognized and applied. An example of such application is described in this issue in the details of the installation at the Bureau of Criminal Identification in Sacramento.

A year of practice has demonstrated that as with every other light source, proper application must be engineered and sold.

PRUD'HOMME GERBER DIXON

TRETHEWAY SCHAEFER NEWCOMB

Codeless but Unbowed

Southwestern Section IAEI debates inspection problems at Santa Barbara meeting

ALTHOUGH handicapped because the 1940 edition of the National Electrical Code did not make its appearance as promised, the Southwestern Section, International Association of Electrical Inspectors plunged bravely into that code by proxy in one of the most inquiring conventions of the Section, at Santa Barbara's Hotel Miramar, Aug. 26-28. From the moment President James I. Dixon, Santa Clara superintendent of the electrical department, opened the meeting until he handed the gavel to his successor, Otis W. Newcomb, chief electrical inspector, Long Beach, to close the annual meeting, the 140 inspectors and interested representatives of other branches of the industry were never allowed an unalert moment.

With an uncanny precision derived from intimate field contact, Secretary-Treasurer Harold L. Gerber had aimed the program at those portions of the code most vulnerable to misinterpretation or confusion. By inviting experts upon these subjects to lead with their chins in presenting a paper on the problem, the way was opened up for subsequent discussion which must have aided those attending materially in clarifying their minds about them.

If the new Code has been charged with a high potential for such confusion and misunderstanding, the Santa Barbara meeting drained off to ground much of this excess capacity. The titles of the papers and subjects may have sounded innocently technical, but discussion following the paper usually released the charge so that it let go with a crack and sparkle that enlivened the meeting. Practical enforcement came to grips with the more theoretical engineering considerations of the Code.

Usual preliminaries started the meeting — greeting by Mayor Patrick J. Maher; welcome by Capt. J. W. Baldwin, secretary of the Santa Barbara contractors, response by Herbert G. Ufer, superintendent of Underwriters Laboratories, Inc., introduction of national officers and the presidential addresses.

International President K. W. Adkins, Missouri Inspection Bureau, St. Louis, reviewed the IAEI activities for his administrative year in his address. Section President Dixon in his emphasized the part inspectors may be called upon to play in national preparedness and then commended the manufacturers of switchboards who last time furnished inspectors with a large-type edition of the Code, suggested it as another good gesture with the new edition and also urged that inspectors be supplied sample boards of the new wires for reference. Secretary-Treasurer Gerber reported increases in both members and finances. The Central Valley, Greater Central Valley, Northern and Southern California Chapters rendered reports through their secretaries, and Imperial Valley Chapter told of its inability to organize and keep going.

Ahead of schedule then, Ken W. Keene, electrical engineer, Underwriters Laboratories, Inc., was asked to make the initial plunge into the deep Code. His paper was on "Panelboards and Switchboards." After explaining the standards for switchboards and panelboards he warned that busbars on ordinary panelboards are not large enough to permit all branch circuits to be loaded to capacity or to be operated at continuous loading because of the diversity allowed. When to be used at near full load on continuous duty he cautioned inspectors to see that busbar capacity is heavy enough, just as they would check feeders, pointing out that unless especially built heavier the assumed average loading is 6 amp. per branch circuit.

This started things. Inspectors arose to protest that a 6 amp. assumed average was too low in view of modern loadings, that contractors just bought panelboards by number of circuits, regardless of busbar labeling in amperes and installed them to serve full 15 amp. capacity continuous lighting loads in stores, even to serve 20-, 25- or 30-amp. branch circuits. Fuses became heaters, panelboards ran hot; evidently the Underwriters standards were not being kept in step with recent Code increases in circuit capacity; new wires and higher permissable loadings would just make matters hotter.

M. M. Brandon, associate electrical engineer for Underwriters in New York, retorted that it was the inspectors' job to see that panelboards having enough capacity were used just as they would check feeders. Inspectors asserted it wasn't as simple as that, urged that the assumed average be raised, that the code and the standards be better coordinated, for an inspector cannot carry standards as well as Code around with him in the field.

TOUSLEY—ADKINS—KIMBALL

That noon Alston Rodgers, illuminating engineer, General Electric Lamp Division, Los Angeles, covered the brighter aspects of fluorescent lighting in an entertaining discourse illustrated by samples of an elephantine new 5-ft. tubular lamp, and by way of contrast, a tiny one, 4-in. long, for lighting airplane instrument panels. Reiterating the advantages and limitations of the new light source, he showed how its application is changing ideas as to what constitutes a lighting system, both as to amount of light and also as to long rather than a round source of light.

George Kimball, electrical engineer, California Industrial Accident Commis-

Why UNIVERSAL Electric Dealers Say:

1940—The Best Range Year Yet!

Across the country, UNIVERSAL representatives have asked Universal dealers, "What kind of range year is 1940?" They have gotten this one answer!

UNIVERSAL Electric Range Sales are up! Dollar volume has hit new peaks! Profits have stratosphered to all-time highs!

First in Sales Features and Design

Dealers everywhere credit UNIVERSAL'S year-ahead styling, speed and economy plus its many amazing features like Mult-I-Heat Control with 101 top-of-range heats for making this their banner range year.

Fall Sales-Producing Strategy Features M. K. B. Tie-In

UNIVERSAL'S big fall sales-making magazine and newspaper promotional campaign, plus a sure-fire tie-in with Modern Kitchen Bureau's fall range drive, plus the UNIVERSAL Election Contest, plus cooperative campaigns, direct-mail pieces, sound-slide films, visualizers and radio announcements—will bring customers to the point of sale...and make sales come easier.

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To the electric range dealer, a UNIVERSAL franchise spells opportunity. It enables you to do business as you want to do it. You can be sure of the product you sell. You can be sure of full profit-margins. For complete details, wire or write your UNIVERSAL Distributor or LANDERS, FRARY & CLARK, New Britain, Conn., today.

UNIVERSAL

"THE TRADE-MARK KNOWN IN EVERY HOME"

Proof . . . and MORE Proof of Bigger Sales and Profits

"UNIVERSALS new Mult-I-Heat Control is the greatest advancement since the Economy Cooker. It has increased my sales 300% over 1939."

B. E. PALMER
ED. PALMER
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"I've found that UNIVERSAL'S new Super-Heat Unit has speeded up electric range sales and helped make 1940 my biggest year."

HARRY TAUBMAN
Wm. Taubman and Sons,
Hartford, Conn.

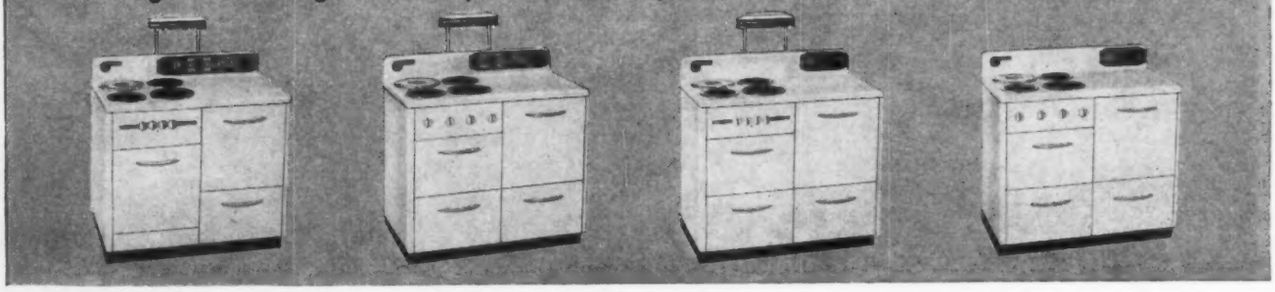
"One look at the modern features and beautiful appearance of the 1940 UNIVERSAL starts women saying, That's the range for me!"

ALAN A. SIGRIST
Sigrist Furniture Co.
Fort Wayne, Indiana

"We are the largest electric range dealer in the city of Buffalo and attribute this volume to the many exclusive UNIVERSAL sales features that make this range a year ahead of the competition."

DON E. STRICKLAND
Taylor-Strickland
Kenmore, N. Y.

These ranges are making sales history for '40. Model prices and step-up features make it easy to sell up



sion and the IAEI's next president, supplemented a report on electrical fires made in the morning by H. V. Dobson of Santa Barbara, by giving a tragic report on electrical accidents in industry. He concluded with a plea for more prevention work by all, emphasizing the inability of his small staff to do much alone.

In the absence of R. H. Manahan, chief of the electrical division, Los Angeles, Joe Rose, Bureau of Power & Light, read Manahan's report on "Article 210-Branch Circuits." In it Manahan sought to explain changes in this article and clarify interpretation. Again practical problems of field application were brought up by Gerber, which would indicate a need for still further refinement.

Next came the most eagerly awaited and most important paper of the convention, that on the new wires and carrying capacities. Howard E. Weber, commercial engineer, U. S. Rubber Co., New York, despite lack of copies of the new Code for reference, gave a clarifying description of the entire subject. He told of the recent re-examinations of wire carrying capacity under modern conditions and how these tests had revealed the old standards to be incorrect. Then he described new rubber and synthetic compounds which give the same or better dielectric protection with thinner walls and specified the particular applications of each type, its temperature limitations and the new Code's rules applying to them. He concluded with cost comparisons.

Ralph Wiley, chief of the department of electricity, San Francisco, followed by reading further clarifying comments from a letter by S. J. Rosch, Anaconda Wire & Cable Co., whose research had been the cause of many of the changes. Wiley however raised the question as to whether the tests as made took into account the diversities found to exist in feeders by field experience. He then read from a table summarizing the possibilities with the new wires but revealed that in some combinations of circuits in conduit, even without calculating in the voltage drop or ambient temperature the new carrying capacity values would eliminate all advantages thought to be gained by use of thin wall.

The afternoon session closed with a paper on "Circuit Breakers and Multibreakers, their characteristics and applications," by O. E. Keeler, switchboard engineer, Westinghouse, San Francisco.

Comparing in importance the qualifications required of dentists and doctors to those which should be made of electricians Otis W. Newcomb, Long Beach, outlined the examination requirements of his ordinance and detailed its operation. A session of questions and opinions followed.

Harry Dobson, Mrs. A. V. Kuntz and Capt. J. W. Baldwin of Santa Barbara, who were such excellent hosts to the recent convention

Since electricity first found use the subject of grounding has split the industry into two camps, the grounders and the insulators. L. F. Adams, G-E Co., Schenectady, discussed the latest rules on grounding to be found in the 1940 Code. Most significant was a trend toward more requirements for the grounding of portable appliances by means of a polarized plug and three-wire cord.

Explaining the printing difficulties that had delayed the Code, Victor H. Tousley, international secretary, IAEI, explained that no matter how carefully prepared, no Code was perfect and it was necessary to go back over it, pick up loose ends, issue interpretations and perhaps interrim revisions.

The "inside" story of fluorescent and gaseous-tube lighting, how and why it works, was told by R. E. Bear, G-E commercial engineer, of Los Angeles. In explaining its operating principles he cleared up the bugaboos one after the other. Lively discussion of these followed and particularly of inspection problems connected with this type of lighting. These included better marking of name plates by manufacturers to facilitate field inspection as to power factor correction, temperatures and ventilation, radio interference.

Wednesday morning's final session opened with a moving picture showing the manufacture of electrical porcelain. E. G. Romeiser, field engineer for Illinois Electric Porcelain, Porcelain Products, and Knox Porcelain, made the accompanying comments.

G. E. Price, Orange county electrical inspector presented a paper on the effects of vibration and physical damage to what started out to be explosion-proof oilwell electrical installations. Use of aluminum or metals of high coefficient of expansion for such fittings was questioned as unwise.

An inspector's public relations needs was discussed by J. W. Whittington, NEMA, and the mainstay of the IAEI public relations committee. Reviewing the booklets, press releases, slides, sound slide films and the movie furnished to the inspectors by the committee during the past three years, his figures of their widespread use and acceptance were highly encouraging.

Another hiatus between the Code and Underwriters' standards was uncovered following a discussion of Article 66, "Special equipment, signs and outline lighting" led by Ben Hill, superintendent, electrical department, Oakland. Trouble comes with outline and decorative neon tubing used on the face of buildings or interiors. New types operate at higher amperages and voltages and differences between sign standards confuse the inspector.

H. C. Hill, G-E Co., Los Angeles, explained the new type markings which are to be put upon motor name plates in the future as he discussed the overcurrent protection of motors and motor circuits. This led naturally into another paper, presented by Arthur L. Riche, vice president of Micro-Switch Corp., on "Inherent Overheating Protection of Fractional Horsepower Motors." Various types of such built-in protection to motors were discussed and illustrated. New developments are those of similar protection for larger motors and for water-cooled motors for air conditioning systems. Such protection was especially recommended as mandatory for domestic refrigerator motors.

Others heard briefly for a word of greeting were M. H. Hedges, research engineer, International Brotherhood of Electrical Workers, Washington, D. C., who bespoke the interest and support of his organization to the Code; and E. J. Crawford, now retired, but a charter member who continues his attendance at meetings. George Kimball, who was to talk on "Working Spaces and Guarding" entered his paper in the transcript and then announced a new circular letter from the Industrial Accident Commission on temporary wiring for construction jobs. He also made the first announcement of forthcoming conferences to bring the Safety Orders up to date with the new Code.

San Jose was selected as the next meeting place, and in the election of officers Otis W. Newcomb, first vice president, was advanced to president; second vice-president Clifford Prud'homme, of Sacramento, to first vice-president; O. D. Butterfield, of Torrence, elected second vice president; Harold Gerber re-elected secretary-treasurer; and J. I. Dixon, the retiring president, named to the executive committee to succeed C. T. Coyle, of Fresno. Other executive committeemen, E. M. McLaughlin, W. J. Tretheway, and C. E. Heise, were re-elected. R. H. Manahan and G. E. Price were re-elected to the executive council of IAEI, and Manahan and Ben Hill reelected Electrical Committee representatives.

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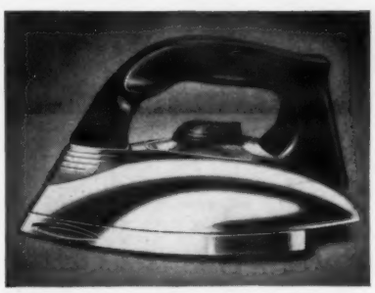

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FEATURES

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ADVERTISING AND PROMOTION

NATIONAL ADVERTISING
General Electric Automatic Irons will be extensively advertised in LIFE, GOOD HOUSEKEEPING and LADIES' HOME JOURNAL during this Fall.

SPECIAL PROMOTIONAL AIDS
Leaflets, banners, display and ad-mats are all part of a complete promotional offer. See your G-E Distributor at once for complete details.

GENERAL ELECTRIC

THE COMPLETE IRON LINE

Election

Strike named president of Northwest L. & P. Assn.

C. J. Strike, president, Idaho Power Co., was elected president of the Northwest Electric Light & Power Assn. for the year 1940-41 at the Association's annual meeting in Seattle recently. He succeeds J. E. E. Royer, vice president and general manager, The Washington Water Power Co., who has held the position during the past year.

S. P. MacFadden, vice president, Puget Sound Power & Light Co., was elected to the vice presidency, while the

STRIKE

following were named vice presidents for their respective states: Idaho, John D. Orr, Idaho Power Co.; Montana, Robert O. Kerr, The Montana Power Co.; Oregon, James H. Polhemus, Portland General Electric Co.; Utah, W. A. Huckins, Utah Power & Light Co.; Washington, C. Patrick Johnson, Puget Sound Power & Light Co.; British Columbia, E. H. Adams, B. C. Electric Railway Co.

Members-at-large of the executive committee elected at this meeting were Z. E. Merrill, Mountain States Power Co., Albany, Ore., R. M. Loughrey, Appliance & Merchandise Dept. of General Electric Co., Portland and V. E. McCain, Graybar Electric Co., Spokane. Walter J. Dennis, Northwestern Electric Co., Portland, carries a holdover term on the executive committee as does J. E. E. Royer, retiring president.

The annual meeting heard reports from the retiring officers, commended the operation of the Association during the past year, and agreed to carry on in a similar manner during the coming year. Membership now stands at 1130, an all-time high.

● EARLE DUNSMUIR was elected president of the Vancouver Electrical Assn. at the annual meeting held recently. Dunsmuir is head of Dunsmuir Electric, and has been vice-president of the association for the past year. George W. Firth, head of the Jarvis-Firth Electric, has been elected vice-president. Members of the executive elected for the ensuing year are: Harry Luncas, H. G. Wallace, Charles Longley, R. B. Gaskarth, Ralph Graham, J. D. Carmichael, T. Barwood and R. Hall, secretary of the Electrical Service League of British Columbia.

Electric Club

FBI agent to speak at S. F. associate member meeting

With Special Agent Bobbitt of the FBI as guest speaker, the Associate Membership of the Electric Club of San Francisco will open its Fall series of meetings Sept. 18. Dinner will be held at Marconi's Restaurant, San Francisco.

Plans for the coming year call for evening meetings on the third Wednesday of every month, with attendance at one luncheon meeting per month of the Electric Club (formerly S. F. Electrical Development League).

Organized one year ago to promote good fellowship among young men in the electrical industry, the group was formerly known as the "X" Electrical Club. Since that time membership has doubled to a total of 40 active members. Recently the "X" Club was included in the Electric Club of San Francisco as an Associate Membership.

Willard Nott of Sangamo Electric Co. will continue to lead the group as president. Garth Chamblin of the California Electrical Construction Co. serves as vice-president. Don Hanson, ELECTRICAL WEST, is secretary; Arnold Shradel of Cutler Hammer, Inc., treasurer.

All young men connected with the electrical industry in San Francisco are cordially invited to attend meetings. Details can be secured from club officers.

● EDUCATIONAL CAMPAIGNS usually conducted by the B. C. Electric Railway Co. in the electrical industry with the co-operation of the Electrical Service League of British Columbia and the Vancouver Electrical Assn., will probably be postponed this year until after Christmas. Activities of the Non-Permanent Militia Units and training camps are now absorbing the attention of many in the industry and those not directly effected by these activities are indirectly effected in some instances through working with a reduced staff due to war conditions.

Exhibit

Electric League stages All-Electric Home show

When the doors closed on the Electrical League of Utah's All-Electric Home, August 18 in Salt Lake City, more than 8,500 visitors had been shown through during the three-week period.

These visitors, most of whom were interested in new homes and new home construction, saw for themselves what the industry means by "Adequate Wiring;" saw what it can do for occupants in the way of providing convenience, easier living, genuine comfort; they saw not only what proper electrical installation is, but also how the latest electrical appliances and equipment are utilized in the modern home—what they are, how they work.

The League's minimum requirements for wiring adequacy were followed closely, and visitors were told by the hostesses that the home had not been wired to excess but that it included only the minimum requirements for present and future use. Requests for wiring information were so many that the League was faced with a problem in contacting all interested parties. Although no effort was made to "sell up" on any of the equipment, hostesses reported numerous inquiries, which when followed through, resulted in sales of appliances.

Advertisements in the Salt Lake *Tribune* and Deseret *News* announced that all the public was invited to see "Today's Electrical Home." So interested was the public, it appears in seeing something different in model homes, that during the first Sunday more than 3,500 people were taken through—so crowded in fact that for hours it was difficult to see the all-electric kitchen.

In order that attention would be focused on the electrical features the house was left unfurnished during the period of its inspection. Hostesses were on hand at all times to guide visitors through. They consisted of wives of Salt Lake City electrical contractors and Utah Power & Light Co. home service girls all of whom were given special instruction by Mrs. Ardell Welch, Home Service Supervisor for the utility's Salt Lake Division.

● A MEETING of the National Electrical Wholesalers Assn. has been set for Sept. 16-18 at the Empress Hotel in Victoria, B. C. Convention, program and entertainment committees have been working hard to make this meeting a successful one. Round trip rates are still in effect and excellent hotel accommodations available.

1 1/3¢ per week for 20 yrs. continuous service!

Do you know that the cost of a Reclosing Fuse Cutout "Type RP2-56" over the cost of a single operation Fuse Cutout "Type PVD", when figured over 20 years of service, is only 1⅓c per week? Weigh this additional cost against the loss of revenue during service interruptions — and the cost of troubleman's trip when a single operation fuse cutout interrupts.

Reclosing Fuse Cutouts give you a second and third line of defense against minor faults, reduce outage time to approximately one second and keep your outage cost down to one fuse link.

L-M has a complete line of Reclosing Fuse Cutouts in porcelain housed and open designs and only L-M Reclosers give you all these dependable protection features—Fully Automatic Operation—Easy, Safe, Simple Handling—Unmistakable Indication of Open Position —Adjustable Time Delay—Vibration-proof Contacts.

Perhaps you might also be interested in the NEW Type "RP-515". This is a 5000 volt — 100 Ampere Porcelain Housed Unit designed to connect to ANY single operation cutout (now on your line) to change it into a Reclosing Fuse Cutout. Ask your L-M representative to show you a sample — or write

LINE MATERIAL CO.
MILWAUKEE, WISCONSIN

Where continuous service is desired

Use

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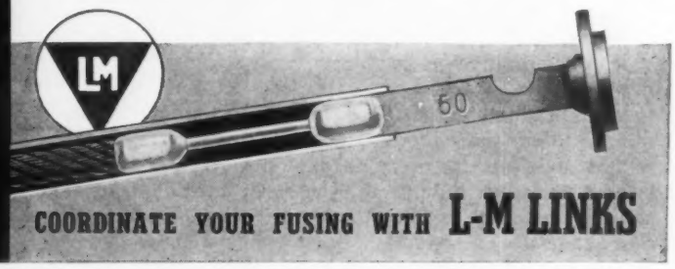


NEWS OF THE INDUSTRY

SAN FRANCISCO AND ICKES COME TO NEW TERMS

The battle of Hetch Hetchy temporarily came to a halt Aug. 22 when the San Francisco Board of Supervisors and the Public Utilities Commission came to terms with Secretary of the Interior Harold Ickes. All parties agreed to a stipulation as a basis for a proposed nine-month stay in the effective date of a Federal Court order restraining the city from further violation of the Raker Act.

This stipulation, which will preserve to the city during the stay period the annual income of $2,400,000 from Pacific Gas and Electric Co. for distribution of Hetch Hetchy power, holds San Francisco to a rigid program.

The city must first make an effort by Oct. 1 to negotiate the lease of PG and E electrical distribution facilities and their operation by Jan. 1, 1941 as a municipal utility. Submission must be made of a charter amendment to the voters for acquisition or construction of a distributing system should the lease negotiation fail.

City officials must also actively support the charter amendment and obtain support from civic organizations for its passage. Opposition must be made to oppose any proposal contemplating amendment of the Raker act by Congress in advance of the bond election.

Secretary Ickes also insisted that the proposed court stay be dissolved if the city enters into a lease affecting Hetch Hetchy power distribution which would not be favorable to him. All action must be taken, finally, for general compliance with the Raker act, in accord with the Supreme Court's decision, on or before July 1, 1941.

Announcement of PG and E reduced rates set for October tends to complicate the city's proposed revenue bond issue which was estimated and made on the basis of current rates. The reduction will force utilities manager Cahill to completely revise these estimates.

★ Pressure: Another of Secretary Icke's stipulations (later withdrawn) was that the Chapter of Commerce and other civic organizations give assurance that they would support the public ownership bond issue proposal. As expected, this brought forth immediate resentment. Meantime the Secretary also insists that no effort be made to amend the Raker Act while the program he has dictated is being put over on the people of San Francisco.

LIGHT BOMBERS

Seagulls are presenting a real problem to the electricians in charge of the maintenance of the decorative lighting system and other equipment at the Lost Lagoon fountain at Vancouver, B.C.

Seagulls have apparently become war-minded and have started to bomb the fountain. They have discovered how hard and solid is the concrete structure and whenever they have a crab or clam that requires cracking they circle high above the fountain, get the range and let go. Their aim is all too good but beyond their accuracy they break many a floodlight lens, according to W. D. Kells, foreman of Vancouver city street lighting.

Anti-gull slingshots are being built and all employees in Vancouver are being trained in this unusual gull defense.

SACRAMENTO DISTRICT CONDEMNS PG AND E SYSTEM

Condemnation hearings against Pacific Gas and Electric Co. brought by the Sacramento Municipal Utility District were initiated by the California Railroad Commission on July 31. Hearings climax a year of field work by commission engineers in establishing a valuation of the property the district seeks to condemn.

C. T. Mess, valuation engineer, presented a report on the reproduction cost now of the company's distribution system sought for purchase in a 600-sq. mi. area. Total value on this basis was given as $9,419,489. Later reports will cover depreciation, severance damages and the value of additions and betterments since May 21, 1938, the date on which the study was based. All findings of the commission are subject to question by either the district or the company. It is estimated that the proceedings will take several months to conclude.

★ Valuation: Value means many things to many people. In this case final figure will probably include more than physical costs. Weight will be given to severance damages and going concern value, both factors when utility systems are cut into pieces.

FEDERAL COURT JURY SETS PRICE ON PUGET POWER

After a three months trial, the longest trial ever recorded in Whatcom County, Wash., and one which was followed with keenest interest by both public utility and private power interests, a federal court jury in Bellingham, Wash. recently set a price of $5,000,000 as an equitable valuation of the Whatcom County properties of the Puget Sound Power & Light Co. in the condemnation suit of the Whatcom County Public Utility District. The award represented a compromise between the company's demand for $7,000,000 and the district's offer of $3,000,000.

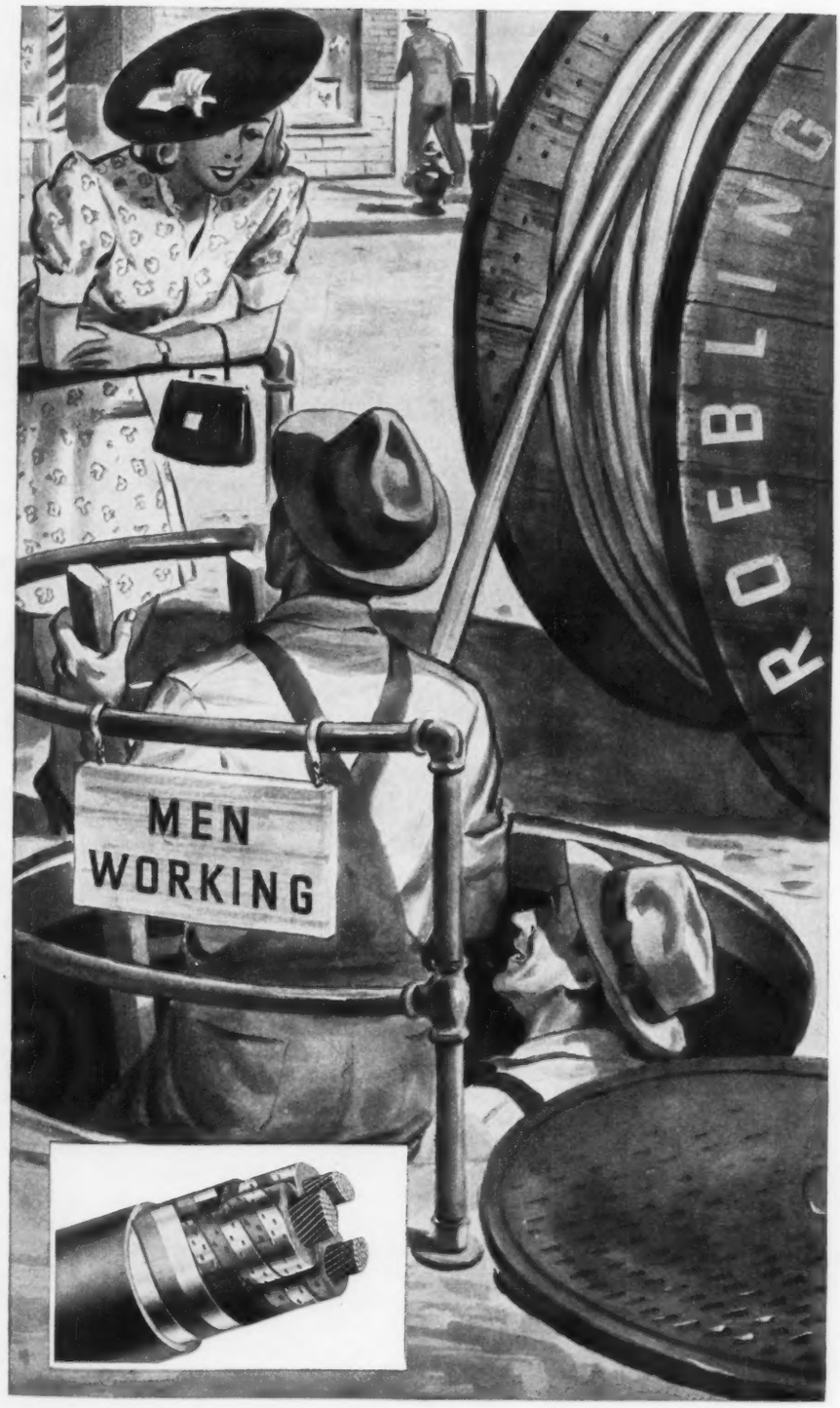
"The verdict," according to President Frank McLaughlin of the Power Company, "speaks for itself. It shows that a jury of American citizens is not going to yield to PUD pressure or a PUD price."

Although they have not taken a formal vote, the Public Utility District Commissioners indicate they are willing to accept the court jury's verdicts, and are conferring with the district's engineers and accountants regarding the proposed deal, in an effort to have the matter placed upon the November 8 election. Meantime, the power company has made no comment as to whether the case will be appealed or whether the company will accept the purchase price ordered. Attorneys for the PUD express the opinion that the company will accept, but that it will wait the full 90 days allowed for appeal before announcing any decision.

A new effort will be made to get Washington public utility districts together on a plan to purchase the properties of the Puget Sound Power & Light Co. throughout the state, according to L. B. Judy, manager of the Skagit PUD, who recently returned from Washington, D.C., where the group he represents failed to get assurance of an RFC loan, or a contract for power from Bonneville.

If all the districts in the state pool their interests, Judy declares, both the loan and the contract can be secured, with a state agency created to make the deal. Private sources will not finance a deal unless a Bonneville contract is assured, he pointed out, thus preventing government competition, and Bonneville authority cannot give such a contract unless all the PUD interests are combined. Some of the PUD district

From Underground Cables to



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commissioners organized the Consumers Non-profit Corp., which failed in its efforts to work out a purchase plan, but Judy said this group remains optimistic.

Puget Power To Spend $140,000 On Line

Plans for the expenditure of approximately $140,000 in the construction of a 66,000-volt transmission line to serve the Bremerton area, home of the Puget Sound Navy Yard, and Kitsap County, Wash., have been completed according to L. J. Bourke, division manager of the Puget Sound Power & Light Co. Clearing of right-of-way and placing of poles has been started. The line will be 24 miles long, requiring the placing of 425 poles ranging in height from 55 to 75 ft. About 72 miles, or 125,000 pounds of copper wire and 1,200 strings of suspension type insulators will be used.

Substation capacity at the President's Point and Bremerton substations will likewise be increased, it was stated, this work involving an outlay estimated at $150,000.

Eugene, Ore. Signs 10-Yr. Bonneville Contract

The city water board of Eugene, Ore., informed the Bonneville power administration today that it had executed a 10-year contract for the interchange of electricity with Bonneville and for the purchase of 1500 kw. of prime power for a period of not less than one year, pending completion of the city's steam plant now under construction.

Power deliveries will start as soon as the Eugene water board can construct the necessary feeder line between its distribution system and Bonneville's substation on the outskirts of the city. Eugene will purchase the prime power involved in the contract at Bonneville's optional prime power rate of ¼ cent a kw.-hr. plus a demand charge of 75 cents a month a kilowatt.

Interchange features of the contract provide for the firming up of both the Bonneville and Eugene power supplies by the exchange of electric power at Bonneville's standard dump energy rate of ¼ cent a kw.-hr. Available excess energy will be supplied by either party to the other upon request.

The contract further provides that in the event of a breakdown or emergency on either system, every effort will be made by the other to provide necessary power as far as is consistent with its obligations to prime power customers.

The Eugene contract contains no stipulations as to resale rates. Administrator Raver said he felt Eugene's record in the conduct of its power business over a long period of years has been exemplary, both from the standpoint of accounting and low rates—rates which are even lower than the low standard resale rates which Bonneville has been recommending for adoption by municipalities using Bonneville power and which are now in effect in Forest Grove and Canby, Ore.

★ Compromise: Bonneville now has a customer on its Eugene line and the latter city has not capitulated on its "home rule" stand.

$83,000,000 Offered For For Puget Power Properties

Trustees of the Consumers Non-Profit Public Power Corp. have authorized an offer of $83,000,000 to Puget Sound Power & Light Co., Seattle, for its holdings and business but power company officials have indicated that the proposition was "without merit."

The Corporation, formed by Public Utilities District Commissioners, appointed Guy C. Meyers of New York City as fiscal agent and negotiator. Meyers was ordered to investigate the feasibility of a $90,000,000 bond issue to finance the purchase and subsequent improvement. Power company officials have indicated that they could not seriously consider the offer. "Such an offer would be without merit and is not worthy of consideration," Frank McLaughlin, president of the Puget Sound Power, said.

Consumers Corporation said that if the sale were consummated, facilities would be leased to municipally owned City Light. The Consumers Corporation predicted a rate reduction of 10 per cent. Explanation of the proposed purchase was forwarded to Mayor Arthur B. Langlie, district commissioners, and to Dr. Paul J. Raver, Bonneville administrator.

The Consumers Corporation was formed in opposition to another group of commissioners, who sought to acquire private holdings through condemnation proceedings in Federal Court. If the offer is accepted, the Corporation stated, it would lease distribution facilities of Puget Sound Power to public districts, with options to purchase.

In competition with the Consumers Corporation, in an effort to purchase the holdings of the power company, is the Puget Sound Public Utility District Commissioners Assn., which is also seeking endorsement from the Bonneville Administration, and has applied to Washington for further aid.

The Public Ownership League of Washington has opened a campaign to place King County Public Utility district initiative on the November ballot.

★ Complicated: Puget Sound's "No" to these purchase overtures plus its latest rate reduction has upset the entire Washington PUD program.

PG and E Rate Reductions Amount To $5,000,000

Reductions in the gas and electric rates of Pacific Gas & Electric Co. totalling $5,000,000 a year were announced last month by Commissioner Ray C. Wakefield of the California Railroad Commission.

The new lower rates will become effective during October. The savings to electric customers of the company throughout its entire system in northern California will be approximately $2,000,000.

Most of the reductions will apply to domestic and commercial customers. Suggestions which were given the Commission by representatives of cities during the ten regional conferences held last month, will have consideration in the application of the new schedule of rates. Engineers of the Commission and of the company are now making studies to determine the exact new rates.

"This is the largest single reduction ever made by the California Railroad Commission on any utility's rates in the 28-year life of the Railroad Commission," said Wakefield.

"The reduction is made possible largely through increased earnings brought about by greater customer use during the last year. The Commission's policy of continuous investigation brings the increased earnings promptly to the Commission's attention. This reduction follows downward adjustments in utility rates made annually for the last five years.

"Tax payments made by Pacific Gas & Electric Co. to the Federal, State and local governments is the largest single item of expense to the company, even exceeding labor costs. Both items have been substantially increased within the last six months. During the progress of this study a revision of the Federal income tax statute has increased the requirements of Pacific Gas & Electric Co., by $1,000,000. Further Federal tax increases are imminent. The Commission has determined the present reductions of $5,000,000 is just and reasonable. It will continue this study of the company's operations during the next six months and at the end of that period will review the effect upon the company's earnings of the reductions now made. Consideration will then be given to the question whether or not further reductions can be effected under the conditions then prevailing."

★ Informal: This latest reduction again emphasizes the successful regulatory technique employed by the California Commission. It has been years since there were any formal rate proceedings; regulation works on a cooperation basis.

Some call it the "SLAUGHTERHOUSE"

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PERHAPS an even better name might be "The Life Extension Institute" for here Anaconda Wire and Cable achieve longer life and durability. Here, purposely subjected to irresistible pressures, metals fail. From studying these failures, Anaconda research men learn to make wire and cable that last longer.

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RFC To Consider Bonneville Sponsored Applications

The Reconstruction Finance Corp. "will give consideration to an application which has the sponsorship and approval of the Bonneville Administration" to finance acquisition by public utility districts in the state of Washington of properties of the Puget Sound Power & Light Co., Emil Schram, RFC Chairman last month officially informed Secretary of the Interior Harold L. Ickes.

Chairman Schram stated that "in our opinion there are no insurmountable difficulties" to this governmental financing of the acquisition. He added that he had "discussed the matter with members of our board" and that "since the Bonneville Administration is a federal agency concerned with the marketing of power in the northwest, it is our opinion that the acquisition of the Puget Sound properties should be sponsored by it."

The Reconstruction Finance Corporation came after organization by popular vote by citizens of the State of Washington of 13 public utility districts in the 19 counties in which the company renders service. These districts were organized for the purpose of public distribution of electrical energy and are entitled to priority in receiving electrical energy generated at the government-owned Bonneville dam, in accordance with the policy laid down by Congress. Negotiations had been entered into by the districts with the intent of acquisition of the Puget Sound Power & Light Co. property involved.

Failure to complete and finance such negotiations, however, had delayed fulfilment of the popular desire until the Reconstruction Finance Corporation undertook to consider the financing.

★Question: This news has raised a question—will Bonneville become the endorser of the PUDs' notes or will the TVA program be initiated? It will be remembered that in Tennesee when districts and municipalities failed in their attempt to take over properties piecemeal, TVA secured Congressional approval to issue bonds and act as purchaser. It then sold back to the cities such properties as they desired and consolidated the remainder into its system.

Ellensburg, Wash. Signs 5-Year Bonneville Contract

Ellensburg, Wash., executed a five-year contract last month for the purchase of 2,000 kw. of Bonneville power. Deliveries to the city's municipal power system will begin next spring. Ellensberg will purchase the energy at Bonneville's optional prime power rate of ¼ cent per kw-hr. plus a charge of 75c per kw. of monthly demand. The agreement provides that the city may take advantage of Bonneville's rate of $17.50 per kw.-yr. at any time during the term of the contract.

Ellensburg will continue to use its own hydroelectric plant to supply a portion of its power needs. The city maintains one of the oldest municipal operations in Washington, having started construction of its generating facilities in 1891.

Ellensburg officials told Bonneville Administrator Paul J. Raver that they recently had announced plans for substantial rate reductions which would give Ellensburg's 2,000 power consumers among the lowest domestic and commercial schedules in Washington.

Bonneville and Grand Coulee Transmission Line Complete

The Bonneville power administration energized the biggest electric transmission line in the Pacific Northwest last month. The 235 mile circuit, built to connect the generators of Bonneville and Grand Coulee dams, was completed.

Administrator Raver pointed out that the Bonneville-Grand Coulee line was built in record time. "Its completion means that the entire Columbia river industrial area is now within immediate reach of two of the greatest power plants in the country," he said.

"By next January, some of the large industrial centers of Puget Sound will also be tied in by direct, high voltage lines. Others will be connected thereafter if necessary funds are provided.

"Within 30 days Bonneville will be able to deliver power over a new 115,000-volt line to the new Aluminum Co. of America reduction plant. The line itself is built. It awaits only the completion of the aluminum plant and a power substation at the plant site."

Describing details of Grand Coulee line construction, Administrator Raver said initial power deliveries would be sent from Bonneville toward Grand Coulee over heavy conductor cables hung from nearly 1,200 steel towers.

Construction of the new line, capable of carrying power at 230,000 volts, was begun last August. Bonneville engineers report that the project set a new record high for high speed line building. Surveys were begun August 25, 1938, less than two weeks after appropriations were made available. Actual construction began on August 7, 1939.

Cost, including acquisition and clearance of right-of-way, surveys and engineering design, was close to $4,000,000. Sufficient right-of-way was purchased to permit the building of a second line of equal capacity alongside the first when power generation at Grand Coulee dam reaches sufficient volume to warrant such construction.

Completion of the Bonneville-Grand Coulee circuit brought the completed portion of the Bonneville administration's transmission system to a total of 441 miles of line. Of this, 315 miles carry power at 230,000 volts.

★ One Agency: As the time approaches for the first installment of Grand Coulee power, talk has started of a central Columbia River agency which would control the sale of power from both Coulee and Bonneville. National defense emergency is the pretext.

Tillamook County Plans On Mountain States Purchase

Tillamook County PUD informed the Bonneville Power Administration last month that Z. E. Merrill, president of the Mountain States Power Co., had told them that the utility will sell the district its Tillamook properties as soon as adequate financing has been made.

In a letter to John Schild, president of the PUD, Merrill gave the district assurance that "in event your people should vote bonds, Mountain States Power Co. would be willing to sell you its Tillamook properties on a fair basis." He added that in event of a disagreement on values his company would be "willing to submit them for determination to some disinterested person or persons."

Commenting on the letter, Tillamook directors declared they plan to take immediate action toward the issuance and sale of a bond issue to finance the purchase. A series of public meetings will be scheduled for discussion of the bond issue preparatory to placing it on the November ballot.

Portland G-E Files Industrial Power Tariff

Portland General Electric Co., Portland, filed a new industrial power tariff with the state public utilities commissioner of Oregon in July resulting in a saving of about $100,000 per year for five pulp paper customers. The new rate, quoted for industrial concerns with a demand of 3,000 kw. or more and served at voltages above 50,000, is the same as Bonneville's alternate wholesale power rate, which is 75c per kw. of billing demand per month plus energy charge of 2½ mills.

The present customers affected are Firtex Mfg. Co. and St. Helens Pulp & Paper Co. at St. Helens, Ore., and Crown Willamette Paper, Oregon Pulp & Paper and Hawley Pulp & Paper companies at Oregon City.

Tucson Cloudburst Cuts Off Power

Electrical service in the Tucson area was restored last month after a three day breakdown caused by a desert cloudburst that took one life and caused damage in excess of $500,000.

Diesel driven generators of the Tucson Gas, Electric Light and Power Co., covered for almost two days under 14 ft. of flood water, began turning again Aug. 16.

Restoration of power ended a sixty-hour period during which the city's drinking water supply dropped steadily and fresh food supplies spoiled because of lack of refrigeration.

An arroyo, passing through the utility property, overflowed its bank under a 2.33 in. rainfall to flood the floor of the entire plant to a depth of six inches.

The local fire department provided two pumping units which worked during the whole night to remove 400,000 gal. of water. In the meantime, the Cortaro plant, a steam turbine standby of 1,500 kw., located 13 mi. west of Tucson, was placed in operation to furnish power to hospitals, the city water works, telephone co. and local newspapers.

Biggest job was to remove mud and dry out the generators and motors of the auxiliaries the next day. Although the generator of the turbine was not flooded, the motors of the auxiliaries were completely submerged.

Forty extra men were employed for cleanup operations. Frank Bowen, of Westinghouse Electric, a specialist on motors and generators, flew from the Pacific Coast to cooperate with the engineering department in drying out the water soaked motors and generators.

Heavy air-conditioning equipment and unnecessary lighting was withheld by customers to make power available to various emergency units.

Puget Power Reduces Rates $797,450

A reduction of $797,450 a year in electric rates of the Puget Sound Power & Light Co., the largest single reduction in the history of the department of public service, has been announced by Don G. Abel, director. The reduction, effective Oct. 1, is the third by the company within a year, and brings the total savings to the customers to more than $1,600,000 annually.

Under the recent reduction, the top step in residence, commercial and retail power rates is down to 3½c per kw.-hr., Abel states, and residence and farm customers outside of Seattle will be saved approximately $342,000 a year. An option residence and farm service rate is provided, which offers 250 kw.-hr. per month for $4.50; an additional 750 kw.-hr. at 7 mills, and all over 1,000 kw.-hr. at 1 cent. This, it is stated, means an estimated saving to customers of $17,500 annually.

Seattle commercial users will be saved $181,000 annually and users outside of Seattle, $116,850, Abel said. Communities affected by the reduction include virtually all areas from Kelso to the Canadian border west of the Cascades, including Wenatchee and surrounding areas.

Abel declared the new rates are in line with the efforts of the department to encourage the lowering of electric rates throughout the state.

Salt River Assn. Discusses Standby Power Expansion

The board of governors of the Salt River Valley Water Users Association last month discussed possible expansion of standby power facilities from the present 10,000-kw. plant to 20,000 or 30,000 kw. to meet the increasing power shortage caused by reduced heads at the association reservoirs.

The board heard a report on the situation from the superintendent of the power department and Lin B. Orme, president, asked that a detailed study of the situation and probable needs be compiled and presented.

The association's present standby plant, powered by two huge Diesel engines near Tempe, was constructed about two years ago, but due to the acute shortage of water in the reservoirs has become insufficient to meet demands.

In asking for the report, Orme requested information to determine whether enlargement of standby facilities would be in the form of increasing the size of the Diesel plant or construction of a steam plant.

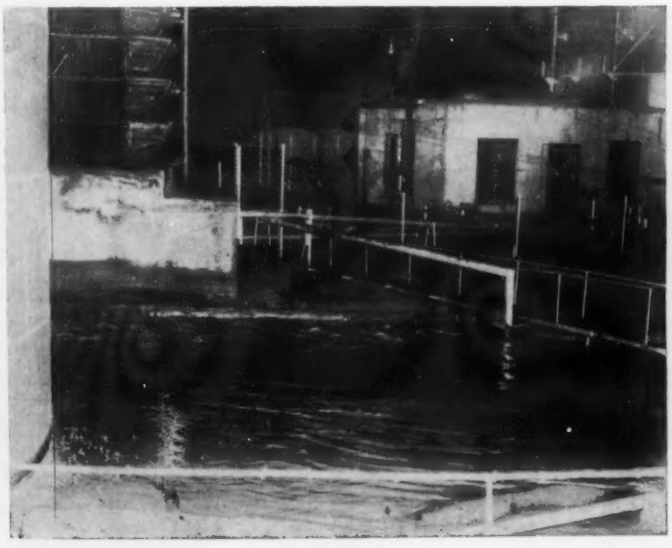
Montana Pays Tribute To John D. Ryan

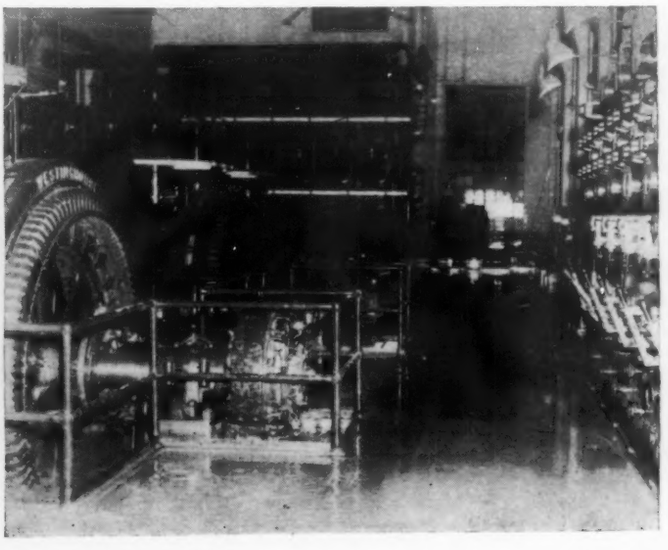
A tribute to the memory of the late John D. Ryan, founder and builder and president of The Montana Power Co. was made enduring last month when the Volta Dam near Great Falls was rechristened the Ryan Hydroelectric Development.

Cornelius F. Kelley, chairman of the board of directors of the Anaconda Copper Mining Co. was speaker on the occasion. He succeeded Ryan as chairman of the board in 1933.

More than 3,000 people attended the impressive dedication ceremonies along the Missouri River as the noted Montanan was honored.

A hopeless battle was waged against this flood of water that descended on Tucson last month and cut off the city's power supply. Entire basement of the Tucson Gas Light & Power Co., including pits of 9 diesel units were flooded





Utah Power Annual Report Judged Contest Winner

The 1939 annual report of the Utah Power & Light Co. was recently adjudged winner of a contest sponsored by Reddy Kilowatt for the best illustrated and most humanized report. The contestants included power and light companies throughout the United States.

The award, given by Ashton B. Collins of Birmingham, Alabama, originator of Reddy Kilowatt, said the company's report "combined simplicity of language with a highly interesting presentation of ideas through the use of Reddy Kilowatt and other cartoon symbols and also used modern concepts for simplifying, streamlining and shortening its income statement."

M. L. Cummings, Jr., advertising and sales promotion manager of the Utah utility, was recently notified also, that newspaper advertising of the company entered in the annual Better Copy contest conducted by the Public Utilities advertising association, was given an award of merit in the Southwest regional district competition.

Tree Seeds Preserved By Air Conditioning

Seeking a better-conditioned tree seedling, nursery storage cellars at Pullman, Wash., are turning to air conditioning to help preserve tree seeds over long periods of time, it was revealed last month by Donald French, vice-president in charge of research, Carrier Corp.

Stored tree seedlings will be kept in a dormant state for long periods in controlled temperature of 40° provided by Carrier refrigeration units in three rooms of the storage cellar. According to French, it has been found that the controlled temperature possesses factors which make for a well-conditioned tree seed.

The installation, which was contracted for by the soil conservation service of the United States Department of Agriculture, is expected to be completed by Sept. 15.

During the summer, the cooling units look after the seedlings automatically, while in the winter, a warmer touch is given them. One of the storage rooms air conditioned is 18 by 25, while the other two are 12 by 18.

● Resolutions urging the universal adoption of the uniform electrical ordinance devised and sponsored by the Pacific Coast Electrical Bureau were recently adopted by the California State Builders Exchange. The ordinance is already in effect in many California communities including several counties.

● Residents of Washington used 6% more electricity in the first quarter of 1939 that they did in the same period of 1938, according to figures released by the State Public Service Dept. at Olympia. Total income from all private and public power sold in the first three months of 1939 was $9,455,439. A year ago it was $8,906,601, or 6.16% less. The survey showed that 479,184 customers were served by all companies of which 334,072 were customers of privately-owned utilities and the rest from the publicity-owned plants in Seattle, Tacoma, Port Angeles, Centralia and others. Residential users contributed $3,911,031 and farmers $464,154, it was stated. Street lighting brought in $231,365 in revenues.

Giant Transformers Ordered by Ickes

Six additional giant transformers for the initial power installation in the world's largest power plant at the Grand Coulee Dam, Columbia Basin project, Wash., were ordered last month by Secretary of the Interior Ickes.

The transformers will be purchased from General Electric Co. on its bid of $570,159. These six 36,000-kva, 60-cycle, single phase, oil immersed transformers are for units L1 and L2, two of the three main 108,000 kva. generating units, comprising the initial installation, except for two station service units, in the left powerhouse at Grand Coulee Dam. Three transformers of the same type were ordered in April for the other unit, L3.

Provision is being made for two powerhouses, one located at each end of the dam, each to house 9 of the 108,000 kva. generators with a total ultimate capacity of 1,944,000 kw. Only the left or west powerhouse is being completed.

PG & E Withdrawal from Modesto Approved

Withdrawal of the Pacific Gas and Electric Co. from competition with the Modesto Irrigation District was formally approved by the State Railroad Commission last month.

The commission granted the private company permission to sell its distribution facilities in the area to the irrigation district for $325,000.

Also approved was a contract agreement whereby the company will continue to supply electric power for distribution by the district.

The sale and agreement ended 17 years of competition between the private and public concerns. P G and E had been serving the area with power since 1890. The district began competitive operation in 1923.

Bonneville Output Totals Released

In the first six months of this year, the output of the Bonneville plant on the Columbia River totaled 72,645,000 kw.-hr., is revealed by the statistical report of the Bonneville administration released last month. Of this output, private utility customers (Portland General Electric Co., Portland, Ore.) took 68,708,500 kw.-hr., or 94.5 per cent. Four public agency customers took 2,395,000 kw.-hr. Total revenue to Bonneville for the period was $159,723.61.

The four public agencies now taking power from the project, with their maximum demands during the first half of 1940 are: Cascade Locks, Ore., 252 kw.; Canby, Ore., 195 kw.; Forest Grove, Ore., 680 kw.; and Skamania County PUD, 198 kw. The maximum demand of Portland General Electric Co. in this period was 56,130 kw.

Bonneville's highest maximum demand since it started to operate was reached last December with 78,000 kw. made up chiefly of the demand of Portland General Electric Co. Bonneville's installed capacity now is 86,400 kw.

Grays Harbor to Purchase Twin Harbors Co.

The Grays Harbor Public Utility District, Aberdeen, Wash., has completed negotiations for the purchase of the properties of the Twin Harbors Electric Co. and took over the holdings on Aug. 31. The price agreed upon was $59,662. Previously, the PUD had threatened to build a competing system if the Twin Harbors Co. refused to sell.

The entire system, manager Beck stated, will be rehabilitated at once, the work involving an outlay of approximately $40,000. As planned, the present 13,000-volt line from Cosmopolis to Westport will be stepped up to 23,000 volts while the single phase lines along the road from Westport to Grayland are to be converted to three-phase.

Westinghouse Employees at Denver Honored

Fifteen Denver employes of the Westinghouse Electric & Mfg. Co. were presented service pins last month at a banquet given by L. D. O'Connell, manager of the Denver branch.

L. A. Goalby and O'Connell were presented service awards for 20 years with the firm. Fifteen-year veterans are E. H. Cox, Glenn M. Young, H. E. Blackmore and E. M. Church.

Pins for 10 years of service went to J. H. Cunningham, Mrs. Alice Nichols, M. V. Maxwell, J. B. Howe, T. R. Lind, H. J. Kongabel, Raymond B. Naber, Lynn Nelson and C. W. Huskinson.

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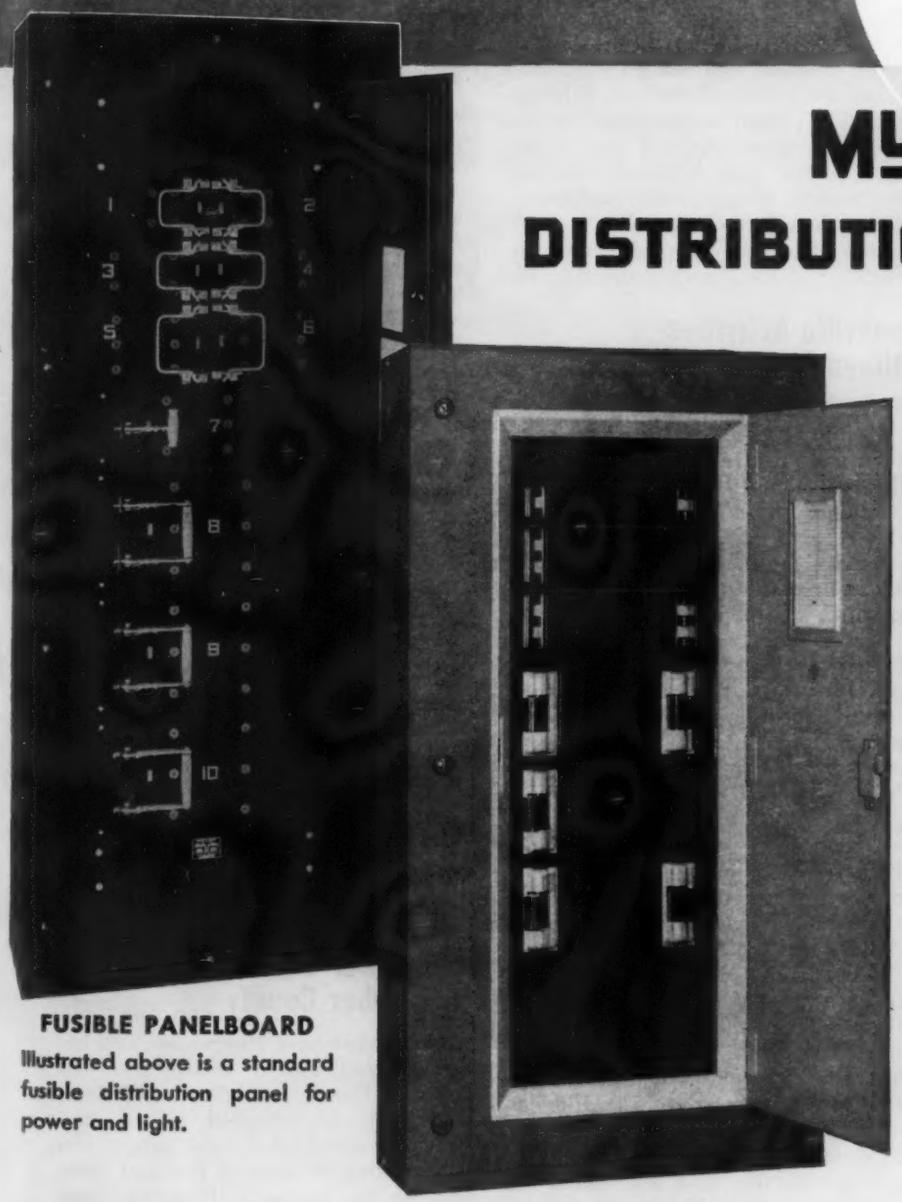
MULTI-BREAKER DISTRIBUTION PANELBOARD



FUSIBLE PANELBOARD

Illustrated above is a standard fusible distribution panel for power and light.

NEW *MH* PANELBOARD

Compare the size of the *MH* panel with that of the fusible panel at left. They both do the same job!

The famous Multi-breakeR principle of simplicity in circuit breaker construction has now been extended to include 100 ampere, 230 volt, branch circuit capacity for power and lighting distribution. Thus for the first time, circuit breaker protection for power and light distribution can be provided at a cost little more than that of fused circuit protection.

Breakers are furnished in 15 to 100 ampere capacities—1, 2 or 3 poles, for 115 and 230 volt, single phase and 3 phase, A.C. systems. Since all breakers used in these panels are common trip (that is, an overload on any pole will cause all poles to trip), they are suitable for use on ungrounded systems, and single phasing of motors protected by these circuits is prevented.

The panels are completely dead front—no live parts are exposed even when restoring the service after an overload or short circuit. The simple rugged construction of the breaker units assures the same long life and trouble-free service that has made the other Multi-breakeRs so outstanding.

***MH* panels are unusually compact—see illustration at left. Therefore, on rewiring jobs, the use of *MH* panelboard interiors in existing panel boxes will provide the additional circuits made possible by the use of the new thin wall wire.**

For complete information, write for Bulletin 5200 and see how inexpensive the new *MH* panel makes modern circuit breaker protection.

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Contractors Plea Not Guilty In Federal Court

San Francisco and Oakland electrical contractors and unions entered a plea of not guilty at the hearing called to hear their pleas, Aug. 20, in the court of Federal Judge Roche, San Francisco. The judge is to set some date in October for setting the date of trial itself. Attorneys for both sides went into consultation immediately following the hearing.

Indications that the Department of Justice is not eager to carry through this case which the contractors are determined to see through to a clean bill of health were noted in the attempt to reach some face saving compromise. For one thing the idea of prosecuting Dan Tracy, newly appointed Assistant Secretary of Labor, who as president of the International Brotherhood of Electrical Workers was blanketed in the indictment, is not looked upon with relish, the attorneys point out. National defense too has changed the policy of the Department of Justice in respect to these anti-trust prosecutions of the building industry, it is claimed. The election year too contributes to a disinclination to rush the case.

On the other hand the contractors maintain that their good name is still in jeopardy, that they were operating a legal and legitimate bid depository and association procedure, and that they will not be satisfied with less than exoneration. Damage to their businesses has been serious and legal expenses to defend themselves costly and to their way of thinking, unjustified by the facts.

In the two other cities in which indictments were made similar delays have occurred. In Santa Barbara the contractors, for lack of funds, decided not to contest the charges but the union has decided to fight the case through so the case will have to go to trial. In Long Beach the case is being delayed until the San Francisco case is heard. No more investigations are being reported from the field at the present time.

Bennion Declares Industry Ready To Assist In Defense

The electrical industry today is prepared to expand its facilities to meet whatever demands the nation may make upon it, Dr. Adam S. Bennion, assistant to the president of the Utah Power & Light Co., declared in an address at the Stanford university business conference Aug. 15.

"In critical days like these," said Dr. Bennion, "when our great outstanding problem is preparation against the threatened ills of Europe, every American industry should rally to the aid of the nation in that it may be adequately prepared. The electrical industry pledges itself to do just that. It stands ready to satisfy every need of the nation in a program of defense."

Dr. Bennion related that since America's entry into the war in 1917, the industry has increased its output 300 per cent.

"The electrical industry today," he said, "is prepared to meet the demands of the nation. It is prepared to extend its facilities to meet growing demands. If more kilowatt hours are called for, they can be produced through existing facilities. . . . Many of the industries, to make war preparations, will have to set up new plants or make adaptations of their present plants and machinery. The electrical industry has but to turn out more of what they are already producing."

Bonneville Activities Outlined By Administration

Nearing completion last month was the 41-mile, 230,000-volt line between Vancouver and Kelso, Wash., fist unit of the extension of Bonneville's network to the Puget Sound area.

The second unit, a 30-mile circuit between Kelso and Chehalis, is 75 per cent complete. Construction of the third unit, which will carry the network into the Tacoma and Seattle area, is under way. All three sections will be ready to receive power for delivery to Seattle, Tacoma, Centralia and other western Washington communities now under contract by January 1, 1941.

Bonneville's 57-mile, 115,000-volt line between Chehalis and Raymond, Washington, has been completed and will be ready to receive energy upon completion of a new substation at Raymond. Power deliveries will be made to the Pacific and Wahkiakum county public utility districts which have contracted for 1,900 kw. of prime power.

First unit of the 115,000-volt line between Bonneville and Hood River is completed. Steel towers have been erected to carry power from the Bonneville power house across the ship canal, army reservation and railway and highway at Bonneville, to a point high on the cliffs of the Columbia gorge. Surveys for the extension of this circuit to Hood River and The Dalles and acquisition of rights-of-way have been completed.

Clearing operations are proceeding rapidly on the 85-mile line between Portland and Astoria, Ore., and the 17-mile line between Salem and McMinnville, Ore. The McMinnville line is scheduled for completion by Oct. 1, when power deliveries to McMinnville's municipal system will begin. The Astoria line is slated for completion early in 1941.

In addition to Bonneville's construction operations, surveys have been completed on eight lines in both eastern and western areas of the Pacific northwest. These include: Bonneville-Oregon City, Ore., by way of Tanner creek, 51 miles; Oregon City-Salem, Ore., 36 miles; Vernita-Yakima, Wash., 34 miles; Yakima-Ellensburg, Wash., 35 miles; Portland-Tillamook, Ore., 63 miles; Vernita-Hanford, Wash., 19.2 miles; Hanford-Pasco, Wash., 35 miles; Pasco-Walla Walla, Wash., 32 miles.

Surveys under way and nearing completion include: Covington-Grand Coulee, Wash., 182 miles; Walla Walla, Wash.-Pendleton, Ore., 44 miles.

Administrator Raver points out that construction of all these lines may not be completed during the current fiscal year. In some cases construction depends on allotment of funds and in some cases, on markets for power.

Substation construction financed by current appropriations is proceeding rapidly. By July, 1941, Bonneville's major substation just north of Vancouver will have electrical equipment installed to control energy deliveries on six 115,000-volt outgoing lines and two incoming 230,000-volt lines. One bank of large transformers has been installed and another is on order. Control and service buildings have been completed and warehouses and shops to serve the western portion of the Bonneville system are now under construction.

Substations are under construction at St. Johns, near Portland, where first units are in operation, at Raymond, Chehalis, North Bonneville and Vernita, Washington, and at Salem, Oregon.

Other substations are being designed for construction at McMinnville, Astoria, Ellensburg and Hood River.

Utah Power Signs Contract With Weber County

Under terms of a 10-year contract between Weber County commission and the Utah Power & Light Co., electric power will be supplied to the new Weber County-Ogden city administration building at rates of two and three cents per kw.-hr., with 10 per cent discounts.

Ogden city commission had decided previously to utilize all free power granted by the company to the city under a franchise agreement for lighting of streets and other municipal property. As the city is unable to enter into contracts for more than two years duration, the city declined to enter into direct agreement with the power company, but agreed to reimburse the county for half of the power costs each month.

POWER MAP shows Far West Electrical Set-up—at a glance!

Those who need facts quickly

all those concerned with planning, building, regulating, selling to or studying electrical systems in the Pacific area will find this map invaluable.

Two years' painstaking investigation makes available a grid showing electrical generating and transmitting facilities in the Western States, complete to January 1, 1940. Not since 1923 has such a service been offered. The map makes it possible to see in one set-up the new electrical systems of the Far West.

RECENT PURCHASERS

of this unique map include the following

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Baker Library, Harvard University
Ebasco Services, New York

The Map Shows

Type, capacity of plants
Voltage, capacity of lines
Type, size of conductors
Receiving station capacities
Interconnection capacities
Ownership of plants

The Map Covers

NEVADA OREGON IDAHO MONTANA ARIZONA CALIFORNIA UTAH WASHINGTON

and parts of British Columbia and Wyoming, and enlargements of sub-transmission facilities in nine metropolitan areas.

Map Scale

1 inch = 22 miles. Size: 52 x 66 inches.

Prepared by Frank I. Towle, Jr.

Write TODAY for complete information on this time-saving service for busy individuals and organizations.

McGraw-Hill Company of California

68 Post St. San Francisco, California

Wash. Water Power and Bonneville Connected

Completion of a switching station at Rocky Junction recently marked the interconnection of the transmission system of the Washington Water Power Co. and the Bonneville project. The switching station, constructed by crews of the power company, is located eight miles northwest of Stratford, east of Soap Lake, Wash., and made the interconnection between the Chelan-Stratford transmission line of the Washington Water Power Co. and the Bonneville-Grand Coulee line, according to a contract previously signed between the Bonneville administration, the Northwest Electric Co. of Portland and the Washington Water Power Co. The agreement was concluded to make it possible for these systems to draw power from each other in case of breakdown or emergency.

Twenty-five men worked in record breaking time to clear and fence an area of 1,600 sq. feet and settle eight 40 ft. poles in holes drilled and blasted out of solid rock. Crews used an air compressor and 125 dynamite sticks in the work, and installed a concrete foundation to receive the 110,000-volt oil circuit breaker and six 110,000-volt disconnecting switches. Weighing four and one-half tons, the circuit breaker was dismantled at the Coulee substation, trucked to the Rocky Junction switching station, assembled and filled with 1,000 gals. of transformer oil.

Installation included a ground grid which consisted of 12 ground rods, 1,000 lb. of salt and 600 gals of water, and a panel house, 8 by 10 ft., was erected to house the telephone board and relay panel.

● As a public service a little out of the ordinary, the operating plant staff at Morony power plant of Montana Power Co., Great Falls, is making an electrical score board for the Great Falls high school. Materials were furnished by the power company and the Anaconda Copper Mining Co. and the time and labor donated by the men who are giving their spare time toward the design and fabrication and eventual erection of the score board. They hope to have it ready by the next football season.

Provo, Utah To Build Third Generating Unit

Construction of a third generating unit at the Provo, Utah, municipal power plant will get under way in the near future. The city will enter into a contract with the Ulen Contracting Corp. of Lebanon, Ind., for construction of the unit which will have a generating capacity of 2500 kw. Cost of the unit and installation will be $240,000.

With the erection of the unit, the city will be able to terminate a standby contract with the Utah Power & Light Co. for which the city is now paying $9,000 per year.

● The Federal Power Commission has ordered that a license be issued to Manti City Corp., Salt Lake City, for the construction, operation and maintenance of an electric power project on Manti Creek, in Sanpete County, Utah. The project, within the Manti National Forest, is now almost completely constructed and the installed capacity of about 530 hp. is to supply electric energy for residential and commercial use in and around Manti City.

● Westinghouse Electric & Mfg. Co., has received a $1,013,020 contract for a 65,000-kw. turbo-generator to be installed in a plant at Wilmington by the Los Angeles Bureau of Power & Light. The plant is scheduled for operation by December, 1942. Purpose of the new station is to provide additional stand-by capacity for the Bureau system which now receives most of its power over three 266-mi. circuits from Boulder Dam.

● Tacoma Board of Contracts & Awards has let contracts as follows: three 1500-kva. transformers to Allis-Chalmers Mfg. Co. for $11,202; steel structure, tideflats substation, fabricate and erect, Western Ornamental Iron Works, Tacoma, $13,154; thirty-two thousand lb. of aluminum cable for Bonneville intertie line, Aluminum Co. of America, $7,083.

RED SEAL ADEQUATE WIRING promotion is given an important role in the general activity of the Pacific Coast Electrical Assn. In collaboration with Southern California Edison, and a Los Angeles builder, illuminated signs are being erected in front of completed homes that comply with Red Seal standards of range and water heater circuits, 1500-watt bathroom air heaters and convenience outlets throughout. Here Vic Hartley (right) PCEA managing director, presents a Red Seal certificate to the builder and purchaser of one of four homes Red Seal wired

Hawaiian Electric To Spend $6,000,000

Increase power demand caused by the expansion of Army and Navy bases in the Hawaiian Islands, is responsible for a $6,000,000 three-year construction program just announced by the Hawaiian Electric Co., of Honolulu, T. H. Major item in the program will be a new generating unit in the company's main steam plant at Honolulu.

Funds for financing the program will be provided through the issuance of $3,000,000 series B 4% bonds and $3,000,000 of Series B 5% cumulative preferred stock, both issues of which have been approved by the territorial utilities commission, but have yet to be approved by stockholders.

Contracts Awarded

To Ne Page Electric Co., Seattle, for furnishing switchboards at various substations of the Bonneville transmission system, $36,499.

To Moore Electric Co., Los Angeles, for construction of an underground electrical distribution system at Hill field army air depot at Clearfield, Utah., $118,786.

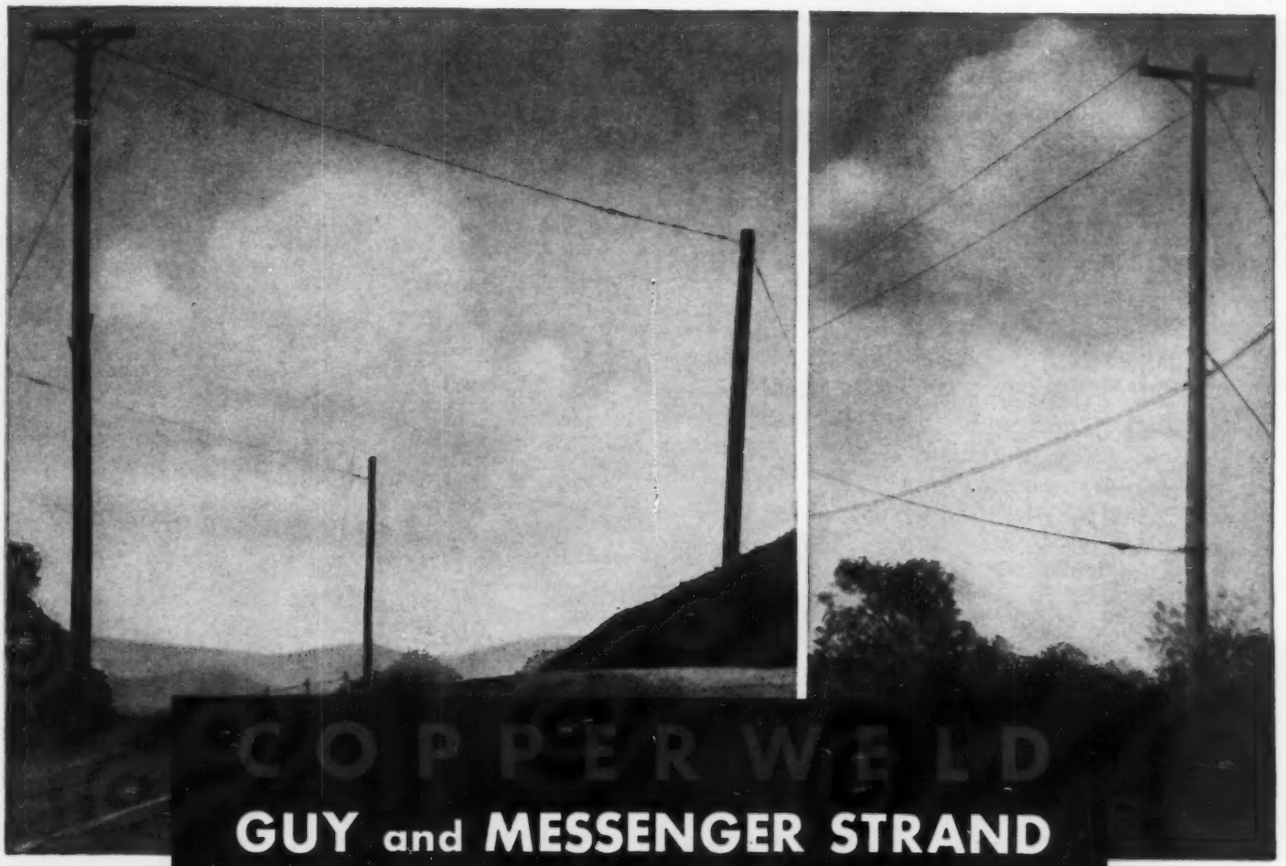
To Yakima Electric Co., Yakima, Wash., for the construction of 7½ mi. of extension to the Kittitas County PUD district at Ellensburg, $4,254.

To Gilpin Construction Co., Portland, for the construction of a dam for Portland General Electric, $30,000.

To Moore Electric Co., Los Angeles, for an electric distribution system for Ogden, Utah, including electric distribution and street lighting system, substation and switching stations, etc., $118,786.

To Brown-Johnston Co., Spokane the contract for furnishing and installing electric wiring and electric fixtures for the new Federal building additions and remodeling, $30,000.

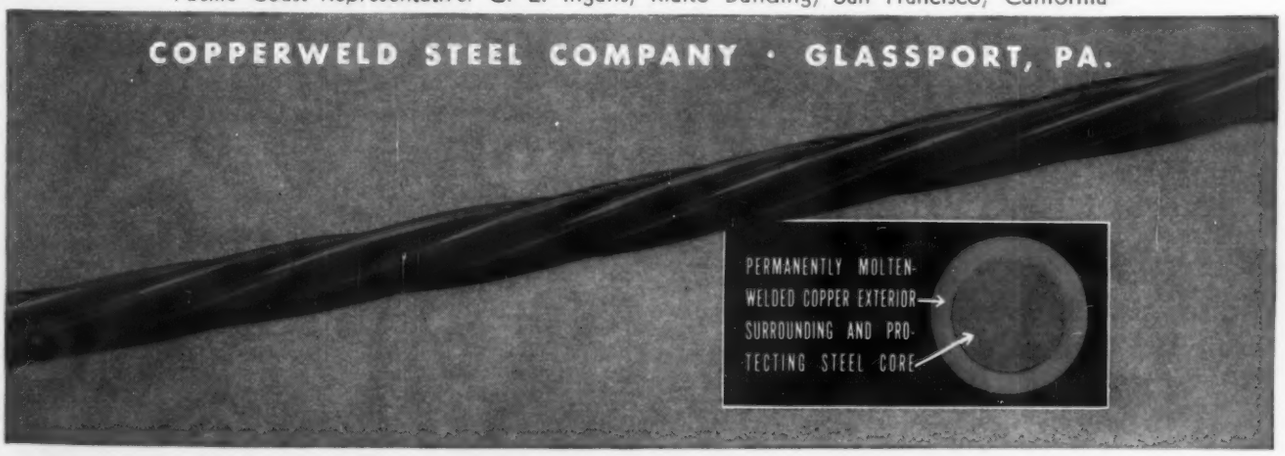
PUT STRAND LIFE ON A COPPER BASIS



GUY and MESSENGER STRAND HAS ALL THE RUST-RESISTING LIFE OF SOLID COPPER.

Put *your* strand life on a copper basis by simply specifying "COPPERWELD" for your guy and messenger strand. Non-rusting Copperweld strand reduces maintenance by preventing costly replacements due to rusting—and you will be surprised at how little Copperweld non-rusting construction adds to the cost of any guy and messenger job. As a rule, Copperweld costs *less than one per cent* of the total cost of the job.

Pacific Coast Representative: C. E. Ingalls, Rialto Building, San Francisco, California


COPPERWELD STEEL COMPANY · GLASSPORT, PA.
PERMANENTLY MOLTEN-WELDED COPPER EXTERIOR SURROUNDING AND PROTECTING STEEL CORE

REA Activities

FARMERS' ELECTRIC COOP., Clovis, N. M. has been awarded $48,000 to build 60 mi. of line in Quay, Curry, and Rossevelt Counties.

HIGHLINE ELECTRIC ASSN., Holyoke, Colo. has been allotted $155,000 to build 203 mi. of line in Logan County.

CLEARWATER VALLEY LIGHT & POWER ASSN., Lewiston, Idaho has been awarded $192,000 to build 135 mi. of line in Clearwater, Latah, Lewis, Nez Perce Counties, Idaho and Asotin County, Wash.

BIG HORN COUNTY ELECTRIC COOP., Hardin, Mont. has been awarded $188,000 to build 157 mi. of line in Big Horn County.

NORTH DOUGLAS ELECTRIC COOP., Roseburg, Ore. has been awarded $177,000 to build 172 mi. of line in Douglas County.

NESPELEM VALLEY ELECTRIC COOP., INC., has been awarded $106,000 to build 49 mi. of line in Okanogan County.

INTERMOUNTAIN RURAL ELECTRIC ASSN., Bailey, Colo. has been awarded $221,000 to build 227 mi. of line in Douglas, Park, Teller, Jefferson and Clear Creek Counties.

PEND OREILLE ELECTRIC COOP., INC., Newport, Wash. has been awarded $15,000 for member extensions.

SURPRISE VALLEY ELECTRIFICATION CORP. has been awarded $15,000 for the construction of an additional unit in the generating plant.

BIG HORN RURAL ELECTRIC CO., Basin, Wyoming has been allotted $112,000 to build 132 mi. of line in Big Horn and Washakie Counties.

WASCO ELECTRIC COOP., INC., The Dalles, Ore. has been awarded $240,000 to build 264 mi. of line in Wasco County.

BENTON RURAL ELECTRIC ASSN., Prosser, Wash. has been awarded $32,000 for a new substation, 9 mi. of line and the conversion of 30 mi. of existing lines to 3-phase service.

GRAND VALLEY RURAL POWER LINES, Grand Junction, Colo. has been awarded $115,000 to build 92 mi. of line in Mesa County.

TRADE NOTES

● DISTRIBUTORS of General Electric Supply Corp. from Utah, Idaho and Montana gathered at the Hotel Utah in Salt Lake City August 5 for an all-day sales conference. Speakers included S. M. Ford, sales manager of the heating division; Harry Styles, commercial engineer for the same division; Robert Brogan, manager of the General Electric Institute, all of Bridgeport, Conn., Roy Lyford of Denver, Rocky Mountain district representative of the company, and E. W. Brown of Salt Lake City, district manager of the appliance division. James L. Schricker, of General Electric Supply Corp., Salt Lake City, was host.

● FRANK WALSH, general distributors, Seattle, have recently been appointed representatives of Connecticut Tel. & Electric Corp., manufacturers of all types of signalling equipment.

● H. W. "JACK" ROLLINGS has resigned from the staff of Stubbs Electric Co., Portland, to become assistant manager of the home laundry equipment and kitchen sanitation division of the Edison General Electric Appliance Co., in Chicago.

● DISTRICT SALES supervisors of Schick Dry Shaver Inc. recently gathered at a national sales conference on Great Captain's Island off Rye, New York, on Long Island Sound. Western representatives at the gathering were J. P. Bosk, Los Angeles; R. E. Company, Seattle, C. W. Gumz, San Francisco and J. H. Blinn, Denver.

● PHILIP O. WESTON has been named Pacific Coast manager for Rockbestos Products Corp., according to H. O. Anderson, sales manager of the company who came to the Coast last month from New Haven, Conn., to arrange the new sales setup. Weston will work in conjunction with Marwood, Ltd., Coast distributors for Rockbestos products, and will make his headquarters in San Francisco. Prior to coming West he was manager of the St. Louis office of the company.

● THE HAMILTON ELECTRIC CO., Waitsburg, Wash., has recently doubled its floor space by the purchase and remodeling of an adjoining building. W. T. Hamilton is proprietor.

● GENERAL ELECTRIC LAMP DEPT., Northern Division at Portland has moved to new headquarters at 1238 N.W. Glisan Street, Portland. L. R. Wilson is manager of this division.

● SCHWEITZER & CONRAD, INC. has appointed Albert S. Gould as its sales correspondent for Arizona. Gould will handle the company's complete line of high voltage power fuses and mountings and other devices. He also handles Joslyn line hardware, and Moloney transformers. He maintains his office at Phoenix.

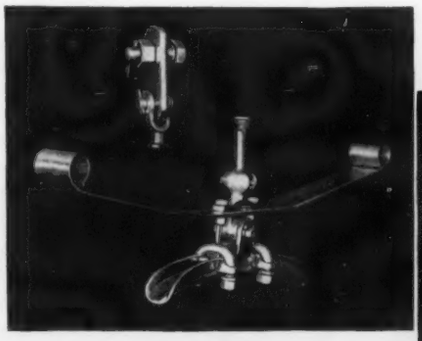
● WINNERS in the nationwide window display contest conducted recently by Altorfer Bros. Co., Peoria, Ill., were The Austin Appliance Co., Denver, Colorado, first prize of $100 in the Class A, miscellaneous appliance stores division; second prize of $60 to Days Home Furnishings, Sanger, Calif. Second prize in the Class B division, (department and furniture stores) went to Powers Furniture Co., Portland, Ore.

WESTINGHOUSE ELECTRIC & MFG. CO.'S Lighting Division has been presenting throughout the West during the past few weeks an interesting two-hour demonstration on fluorescent lighting. Sponsored by Westinghouse distributors, this show has played to "standing room only" crowds in Los Angeles, San Francisco, Portland, Seattle, Spokane, Butte and Salt Lake City. Above are the three men who presented this fine demonstration. Left to right, they are Frank T. Anderson, district lighting engineer; D. E. Jenkins, sales promotion, and N. C. Warner, manager lighting sales, Westinghouse Lighting Division. To the right in the center picture may be seen one of the new Westinghouse plastic fixtures

Soup to Nuts in Hi-Line Hardware

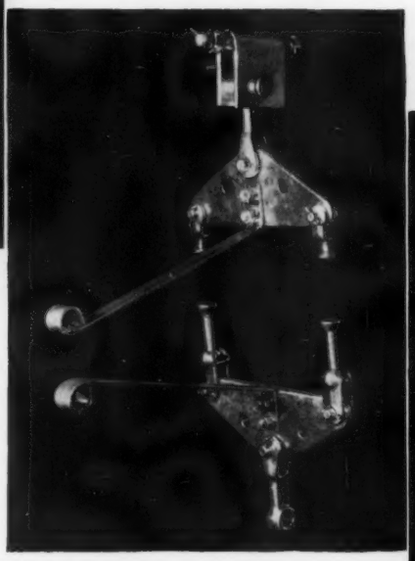
And this good 1937 cuisine was repeated for the 1940 circuit. Originally designed in cooperation with the utility and insulator engineers for the one of the Boulder Dam lines and forged by B. T. C.

Years of contact has given BTC a close insight into the needs and requirements of the utility field and a rich experience in forging hi-line hardware. Ask your insulator manufacturer.



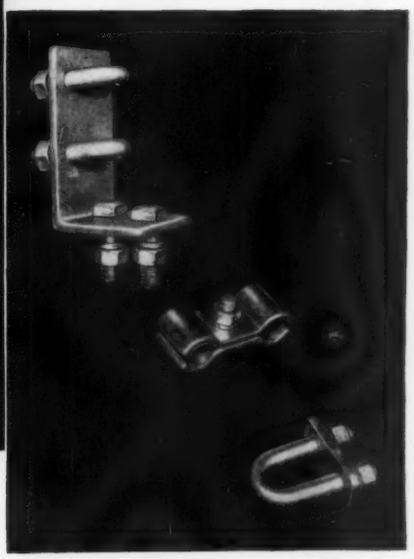
SUSPENSION ASSEMBLY

Showing a clamp of special length with very high slip strength and more than ordinary corona performance. Note the heavy duty horn support fitting and arcing horn.



STRAIN ASSEMBLY

Special design throughout — forged yoke plate—special connectors to tower and strain clamp — special arcing horns and special tower clevis and bolts.



JUMPER ASSEMBLY

Running from top to bottom. Special angle for attaching pipe to yoke plate. Special jumper to pipe—stiffener clip. Special U-Bolt and plate.

More than a Forging
A Service

BTC

Brewer-Titchener Corp., Cortland, New York

ABOUT PEOPLE

Hobbs Named Sales Manager of Smoot-Holman

Leonard A. Hobb, since 1934 San Francisco district manager of the Smoot-Holman Co., Inglewood, Calif., became general sales manager of the organization on Sept. 1. Hobbs succeeds the late A. E. Clarke. A native Californian, he attended school in Santa Maria and later at the Univ. of California. After early experience in power house construction work and maintenance, he took up illumination sales work, a field in which he has specialized since 1912.

For ten years until 1922 Hobbs was lighting specialist and later specialty sales manager for the Western Electric Co., in Los Angeles. In that year he joined the Gute Co. of St. Louis in lighting sales and engineering work on the Pacific Coast. He left that organization in 1934 to develop the commercial lighting fixture line of the Smoot-Holman Co.

He has ben a member of the Illuminating Engineering Society for many years, having served as local section chairman, member of the board of managers and on numerous IES committees. He has been active in both the San Francisco Electric Club and the Pacific Coast Electrical Association. He is also a member and director of the Ben Franklin Electric Club of Northern California.

Hobbs has been recognized as an expert on both hospital and school lighting and has published articles on both of these subjects. He has been given credit for developing and popularizing indirect illumination in the commercial lighting field.

Gale F. Thomas, formerly lighting specialist with the H. B. Squires Co.,

HOBBS

will succeed him as San Francisco district manager. Thomas is a graduate electrical engineer from Stanford University, having specialized in illumination.

Kelly New Asst. Counsel at Bonneville

Edward C. Kelly, Medford and Portland attorney, has been named assistant general counsel for the Bonneville Power Administration. He succeeds William T. Martin who has resigned to enter the private practice of law in New York City. Martin, former Tennessee Valley Authority attorney, has been a member of the Bonneville staff since May 1939.

Kelly is a graduate of the University of Oregon law school. Prior to entering the university he attended high school at Medford. He has been a member of the Oregon bar since 1927 when he entered law practice in partnership with his father, E. E. Kelly, Medford attorney.

In 1933 he served in the regular and special sessions of the Oregon legislature as state representative. Since that time, he has served as attorney, review attorney, state attorney, and regional counsel for the public works administration and as special attorney for the department of justice at Nome, Alaska.

● HARRY W. LIPPERT, electric range specialist for the Gibson Electric Refrigerator Corp., has been named by F. E. Balser, general sales manager, to build up Gibson distribution on ranges in the middle and far west. Earl Nobles, formerly with Landers, Frary & Clark and the A-B Stove Co. will handle eastern division business.

● R. C. GOODRICH was recently named head of the electric range department of Montgomery Ward's Spokane store. Goodrich formerly was field manager of the electric range department in the Oakland control store.

● G. B. BUCK, chairman of the Denver Electrical League, last month spoke at the annual national convention of the Public Utilities Advertising Assn. in Chicago on "What Sales Management Expects from Advertising."

● MIKE DAVIES, managing director of the Langley Mfg. Co., producers of switch-boards and heavy electrical equipment, was recently elected chairman of the Granville Island branch of the Canadian Manufacturers' Assn. at Vancouver, B. C.

● ROBERT L. ADAMS, for five years service dispatcher for the Puget Sound Power & Light Co. at Olympia, has resigned to become manager of the West Douglas Electric Cooperative, a rural electrification project at Roseburg, Ore.

Stocks at San Francisco
Electrical Specialty Co., Inc.,
316 Eleventh Street

Stocks at Los Angeles
Electrical Specialty Co. of So. Calif.,
451 South San Pedro Street

Stocks at Seattle
Electrical Specialty Co., Inc.,
714 Fourth Avenue

For the Coast Trade

At your doorstep you now have an adequate stock of popular D-H alloys, wires, ribbons, rods and other forms.

Driver-Harris Company
Harrison, N. J.

TRADE MARK REG. U.S. PAT. OFF.
Nichrome

THESE MEN KNOW THERE IS A GOOD 3-Way Profit*

WEBSTER ELECTRIC in Teletalk Amplified Intercommunication

REG. U.S. PAT. OFFICE

This is a Model 224 Teletalk. It has a capacity up to 24 stations. Teletalk models ranging from simple five station systems to deluxe models with "busy signal," confidential handsets and other features are available to meet every intercommunication requirement.

* A Profit on Teletalk, A Profit on Labor, A Profit on Materials

Estimate What Your Profit Would Be On Jobs Like These . . .

These electrical contractors KNOW there is a three-way profit in Teletalk. That's why they are selling Teletalk. That's why they are getting repeat business on Teletalk.

Teletalk can be installed by any qualified contractor. When you install Teletalk you make a three-way profit* —a profit on the sale of Teletalk—a profit on the materials required—a profit on the labor.

Some contractor in your city is going to get the Teletalk business. It can be you. Start now by writing for full details.

J. N. Barkdull, Cleveland, installed a 10-station executive control Teletalk system at Pump Engineering Service Corporation —a division of Borg-Warner.

Henry Dormitzer, Boston, installed a seven-station Teletalk system in Carter, Rice & Co. The job required 225 man-hours. Dormitzer made a three-way profit!

Carl Gebbers sells Teletalk, displays Teletalk, and uses Teletalk in his own place of business. His jobs include the John Hamrick Theaters in Tacoma, Wash.

Harold Lloyd, New York, installed a 12-station Teletalk system for American Airlines which controls a multitude of operations in their buildings at La Guardia Airport.

Licensed by Electrical Research Products, Inc., under U. S. Patents of American Telephone and Telegraph Company and Western Electric Company, Incorporated

WEBSTER ELECTRIC COMPANY, Racine, Wis., U. S. A. Est. 1909. Exp. Dept.: 100 Varick St., N. Y. C. Cable Address: "ARLAB", New York City

Webster Electric

"Where Quality is a Responsibility and Fair Dealing an Obligation"

MANUFACTURERS OF TELETALK INTERCOMMUNICATION AND PAGING SYSTEMS • POWER AMPLIFIERS AND SOUND DISTRIBUTION EQUIPMENT • RADIO PHONOGRAPH PICKUPS • IGNITION TRANSFORMERS AND FUEL UNITS FOR OIL BURNERS

● CHARLES L. WHEELER, president-general manager of the Salt Lake Hardware Co. electrical distributors for the Intermountain area of Norge appliances and electrical supplies, was elected president of the Salt Lake City Chamber of Commerce at the recent annual election meeting.

● WILLIAM C. ALLEN and M. W. Thomas have been promoted assistant general auditor of the Utah Power & Light Co. and assistant treasurer of the Western Colorado Power Co., respectively. Allen, who formerly held the position of assistant treasurer will make his headquarters in Salt Lake City; Thomas will continue as district superintendent at Durango, Colorado.

● A. B. DIBNER, general manager of Burndy Engineering Co. of New York, toured the Pacific Coast last month, visiting with Burndy agents and investigating business conditions.

● VERNA L. MILLER, director of the Frigidaire home economics department, Dayton, Ohio, was recently featured at a meeting conducted by E. A. Blakney, Jensen Byrd Co., for home service advisers in Spokane. Miss Miller, en route to Dayton after having opened the Frigidaire exhibits at the exposition in San Francisco, described the educational features of the "show" sponsored by General Motors in presenting the Frigidaire electric range and refrigerator.

ANIMATION of a window display hops up its attractive power. Ray O. Fischer, display manager, Southern California Edison Co., has found from experience. To dramatize sight and light, he created this strikingly effective window background for use in all the company offices.

● LLEWELLYN LLOYD, commercial sales manager of the Flint Distributing Co., Salt Lake City, was guest of honor at a recent dinner-dance given by the company prior to his leaving the company to take over the sales management of Stirlings, Inc., appliance dealers of Pocatello, Idaho. Lloyd has been associated with the Flint Distributing Co. since its inception.

● ARTHUR SCHANUEL, field representative National Adequate Wiring Bureau, New York, was the speaker at an adequate wiring meeting held recently at the Matchless Electric Home, Los Angeles, under the auspices of the Electrical Development League.

● R. P. MOSER has recently returned to Spokane as lighting specialist with the General Electric Supply Corp. After graduating in electrical engineering at Oregon State College, Moser spent seven years with the lamp department and General Electric supply in Cleveland and Pittsburgh before coming to Spokane in 1935.

● GENE WALKER has been appointed general superintendent of the Eastern Oregon Light & Power Co. succeeding the late James H. King, who had held the post for 20 years, according to LeRoy Grettum vice-president and general manager of the company. Walker has been employed by the company in La Grande, Ore. for the past 15 years. Raymond Gray, chief salesman, has been promoted to Walker's former position and Joseph Boyer, Baker, Ore. will fill Gray's position as salesman.

● FOUR EMPLOYEES of San Joaquin Power division, PG and E, were retired from active service last month under a pension plan put into effect three years ago. They were H. L. Alder, credit manager of the Valley Electrical Supply Co.; Ernest M. Allison, truck driver in the Fresno district electric dept.; W. E. Durfey, asst. treasurer, and Rod McDonald, Taft storekeeper. All were honored recently at banquets by fellow employees before their retirement.

● M. A. STRAND, electrical contractor of Salt Lake City and prominent national ski official, has been appointed chairman of a Utah committee to aid in raising funds for the Norwegian-Relief, Inc.

● GEORGE GARTHORNE, chief of the division of electricity at the Golden Gate International Exposition, has resigned to become chief electrical engineer for Johnson, Drake & Piper, contractors who are building the Alameda, Calif., U. S. Naval Base. Gilbert Wood, Garthorne's assistant on Treasure Island, succeeds him.

● WILLIAM E. MELARKY, sales specialist of W. A. Ramsey Ltd., Honolulu, resigned recently to become executive engineer of the Hilo Electric Light Co. at Hilo, Hawaii.

● EVELYN HUNTLEY, Colorado Central Power Co., Englewood, Colo., won first award recently in the street and highway lighting slogan contest conducted by the Rocky Mountain Electrical League. L. Werkmeister, B & R Electrical Supply Co., Denver, took the major prize for his Adequate wiring slogan.

● W. G. MURRIN, president of the British Columbia Electric Railway Co., with head office in Vancouver, has recently accepted an appointment in the Board of Governors of the University of British Columbia. Murrin was chosen to fill the vacancy created by the resignation of Major General Victor W. Odlum, who has left to take command of Canada's Second Overseas Division.

Deaths

● ALMA ETNA FREEBURG, publicity director and stenographic bureau head of the Coast Counties Gas & Electric Co. died Aug. 12 after a long illness. Miss Freeburg graduated from Santa Cruz High School, where she was active on school paper. In 1926 she joined the Santa Cruz Seaside Co. in a promotional capacity, and later went with Del Monte Properties as a publicist. In 1929, she went with Coast Counties in a newly-created publicity department, and worked in San Francisco for a number of years with the utility before being transferred back to Santa Cruz in 1933.

● THOMAS L. FELLOWS, one of the Utah Power & Light Co.'s veteran employees, died recently in a Salt Lake hospital. He was 71 years of age and had been employed by the company since 1908. He was retired last November.

Facts You Can Use to Cut Distribution Costs . . . No. 1

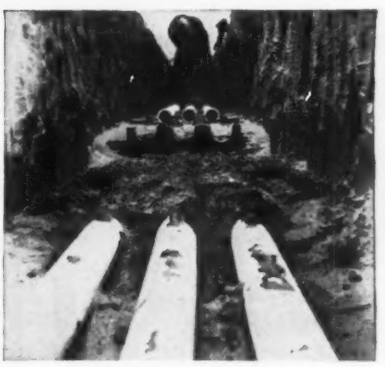
No Concrete Casing is needed when you install J-M Transite Conduit. It does not warp . . . holds its strength and true form under heavy earth loads and traffic stress.

TRANSITE DUCTS ARE STRONG!

Made of Asbestos and Cement, Transite Conduit cannot rust or rot . . . offers exceptional resistance to all forms of corrosion.

YOU SAVE all the expense of "concreting-in" when you use J-M Transite Conduit. So strong it needs no protective casing of any kind, this durable duct holds its true form under sustained earth loads and traffic pressure. Warping is practically eliminated.

And you spend less money on maintenance, for Transite is an asbestos-cement product . . . non-metallic and inorganic. It can't burn, rot, rust or cause dangerous fumes. Yet installed costs are low, for Transite's long lengths, light weight and smooth bore make work fast and economical. For details, write for brochure DS-410. Johns-Manville, 22 East 40th Street, New York, N. Y.



Transite Ducts are light in weight, easy to assemble. Their smooth bore stays smooth in service . . . permits easy, rapid cable pulls at any time.

FORGET FIRE, WEATHER, CORROSION **SPECIFY**

JM Johns-Manville

TRANSITE DUCTS

TRANSITE CONDUIT . . . For use underground without a concrete envelope and for exposed locations.

TRANSITE KORDUCT . . . For installation in concrete. Thinner walled, lower priced, but otherwise identical with Transite Conduit.

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PROFILES OF THE MONTH

Guy W. Faller now heads the Public Service Co. of Colorado as president and general manager. He was formerly its vice-president

W. C. Mainwaring, merchandising head of B. C. Electric Railway, was recently re-elected vice-president of Canadian Electrical Assn.

James L. Fahey, G-E Supply Corp., Salt Lake, has been named to direct Xmas activities this year through jr. chamber of commerce chapters

E. C. Low, president, John A. Roeblings of California, has one of the longest periods of actual years of service in the electrical industry

Left to right are H. S. Haynes, H. S. Travers, and A. F. Lemmon, of Reno, Nevada, who are fellow co-workers in a successful electrical repair business recently set up in the "biggest little city in the world." Here, between jobs, they proudly stand in front of their new establishment

Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

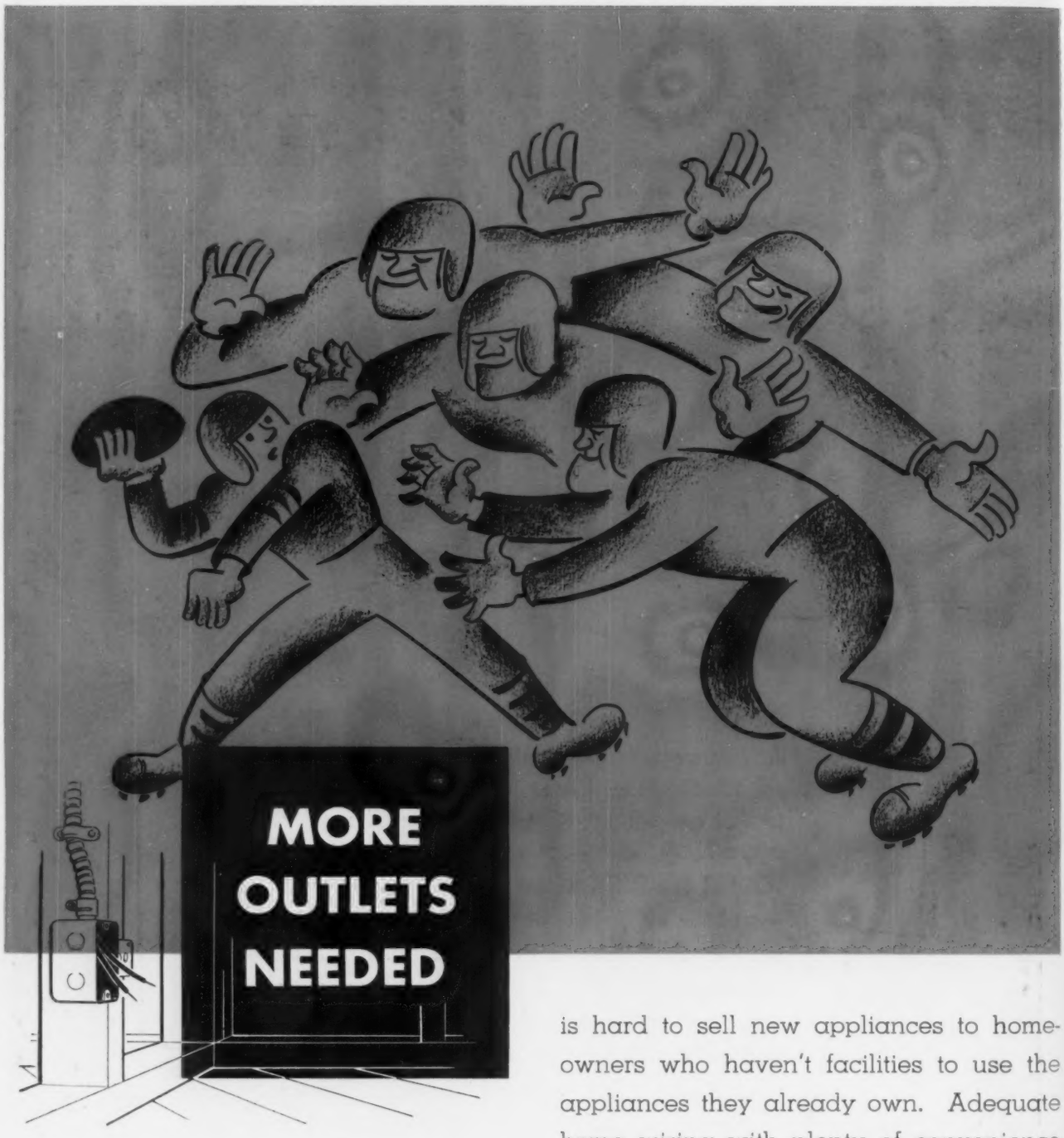
ELECTRIC APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

Home Laundry Campaign

Feature event of this month is the Electric Appliance Society's washer and ironer campaign, and to that campaign P. G. and E. will lend its major support. Advertisements stressing the CUSTOMER BENEFITS of both washers and ironers —and the 10% campaign discount on ironers— will be published in 275 newspapers throughout P. G. and E. territory. Add to these newspaper advertisements a full program of radio, display and point-of-sale advertising and you've got a campaign which promises big results. Dealers are urged to contact their wholesale distributors at once. Nearly every one is participating.

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

EW 109-940



You're stopped before you start when inadequate wiring carries the ball. Inadequate home wiring curtails the potential market of the entire electrical industry. It is hard to sell new appliances to homeowners who haven't facilities to use the appliances they already own. Adequate home wiring with plenty of convenience outlets opens the way to bigger profits for the contractor, electrical dealer and utility. Promote adequate wiring for both old and new homes today and every day.

PACIFIC COAST ELECTRICAL BUREAU

601 WEST 5TH STREET LOS ANGELES • 447 SUTTER STREET, SAN FRANCISCO

CERTIFIED ADEQUATE WIRING

9-40